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## ADDRESS.

### THE EVOLUTION OF SPECIALISM IN MEDICINE.

The Presidential Address delivered before the American Association of Obstetricians and Gynecologists, at Pittsburg, Penn., Sept. 21, 1898.

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*Fellows of the American Association of Obstetricians and Gynecologists:*

In conforming to the custom which demands an address from your retiring president, I cheerfully and feelingly comply with that other usage which requires that my first expression, on this occasion, shall be one of profound gratitude for the honor conferred in electing me to preside over this, your eleventh annual convention.

We have at this meeting entered upon the second decade of our organic existence. The moment is opportune for a brief reflection upon the purpose which brings us into annual convention. That that purpose is real and deep and earnest is shown by the fact that each of our reunions but serves to increase the enthusiastic devotion to work which has always characterized our proceedings. From the day of the preliminary convention at Buffalo, April 19, 1888, to this moment, there has been no flagging in the task to which we, as a body, have set our hands—the task of broadening, deepening and refining those beneficent departments of the healing art embraced in the title of our organization. To this congenial task we shall continue to devote the best energies of our nature. But while our object and purpose is clear and distinct, it may be well for us to pause a moment and consider, in a somewhat philosophic way, not only our present status, but those forces and conditions which brought us into existence and those influences which shall determine our destiny.

It is safe to accept ourselves, in our organic form, as an integral part of a complex social fabric. Social fabrics such as ours have their origin in primitive conditions from which they are evolved in conformity to established laws—laws which deal with matter and motion and force. We can fancy that the starting-point was a stable equlibrium, which, in fact, can be nothing more than a theoretic conception that marks the transition between growth and decay, between life and death. In the course of those changes which we recognize as developmental and progressive we are constantly confronted by phenomena which display on the one hand the persistence of immutable force, and on the other, the diversion of that force into multitudinous channels through the instrumentality of resistent inertia. The results are not only correspondingly mulitudinous, but each result is susceptible of further segregation, in the course of progression to final effects. Thus, each division of initial force results in the changing of a uniform into a multiform force, while each separate form of the latter becomes itself a specialized force, susceptible of further subdivision. It follows, therefore, that we must accept as a fundamental sociologic doctrine, based upon primary biologic law, that progress is due to the gradual evolution of heterogeneity. This process is exemplified, not only in the complex social organisms, but in every phase of organic life. The seed that drops into the soil speedily loses its homogeneous character in the process of germination, and, still further, in each successive change, until maturity is attained in shrub or tree or plant. In the act of human reproduction, the same phenomena are exhibited in even more complex form in the mysteries of embryologic development and in the conditions of subsequent individual existence. What is true of the individual members of the vegetal and animal kingdoms is still further manifested in the origin and development of species in those departments of nature. The ultimate products are manifested in the complex flora and fauna that today entrance our naturalists in their efforts of analytic research.

We find the lesson that best subserves our purpose exemplified in the initial changes which take place among the most primitive of peoples. Let us take, for example, as suggested by Mr. Spencer, a tribe of North American Indians. Living as they do chiefly by the chase, an early necessity which they encounter is the means of killing their game, and let us say, each man provides himself with arrows for the purpose. Presently one of the number, as the result of accidental influences or conditions, discovers that he can make better arrows than can his fellows. They, in turn, desiring the best implements, go to him for their arrows, for which they compensate him with mats or baskets or fishing gear; while he, stimulated by reward and the distinction implied by patronage, restricts his labors to his new-found task, improving his product in excellence with that increasing skill which comes alone from practice. The influence is reciprocal, and its widening range is noticed in the improving quality of the mats and baskets and fishing gear made by those who find it no longer necessary to make their arrows. Here is the multiplication of effects from an initial cause, and here too, we observe the commencing specialization of function and of labor exemplified among the most primitive of peoples. What is true of these simple folk, is true in a more pronounced degree throughout the increasing complexity of civilized society. So true is this, that today there is not a single department of human activity; there is not a single product of human labor, mental or physical, but is dependent for its possibility upon numerous other highly-specialized human activities. In the building of a house, how many special activities are exercised in forest, in quarry, in kiln, in

factory and in the final act of construction, until the finished structure stands ready for the coming of its owner? In the construction of the stately bridges that span the three rivers that here mingle their tides, how many "specialists" have been engaged in the mine, the forge, the foundry and the coffer-dam? In making and operating the railroads over which you came hither with such comfort, safety and speed, how many "specialists" have been and are employed? The telegraph, the telephone, illuminating plants, and hydraulic institutions are but a few—a very few—other examples made possible only by employment of highly-specialized human skill. From these observations, we are forced to conclude, with that master-genius who has formulated with such clearness the philosophy of evolution, that a "part-cause of evolution is the multiplication of effects, and that this increases in geometric progression as the heterogeneity becomes greater"—conclusions which are not only "established inductively but are deducible from the deepest of all truths."

But if primitive people required arrow-makers or the fabricants of other implements, other necessities speedily arose, chief among which was attendance on those who were injured in the chase, who were wounded in battle, or were sickened by the effluvia of the primeval swamps. It was at this point that your progenitor, "the medicine man," stepped upon the scene. He is the necessary and inevitable incident of every primitive people. The Egyptians had their sages, soothsayers, and *pastaphori;* the Persians had their *genii;* the Phœnicians their *cabiri;* the Hindoostanese their *vaidyas*; the Tartars, their *shamans;* the Scythians, their *enares;* the people of Borneo and Sumatra, their serpent-charmers; the Zulus, their rain doctors and *tnwalas;* these are among the examples of the earliest formation of the medical branch in the social segmentation of primitive peoples.

In compliance with the law governing the multiplication of effects, these primary specializations were speedily followed by secondary specializations, traceable among peoples whose progress in civilization enables us to follow the successive phenomena of their evolution. Thus, among the earliest Greeks, who inherited much from antecedent peoples, and who appear in the arena of history with a complex civilization, we find, at the Homeric period, medicine locked up in the noisome cabinet of superstition, zealously guarded by an ignorant priesthood; yet in the days of Hippocrates there were regular surgeons to the armies, there were midwives, or navel-cutters, there were oculists, dentists and lithotomists, and there were *iatreia*, or clinics, both public and private. Rome, which began with the *augurs* and *haruspices* and other practicians of base superstition, had so far exemplified the process of specialization, that by the time of the Empire, there were not only general practicians, but there were, according to Baas, "oculists, aurists, surgeons, dentists, uroscopists; specialists in bleeding, catheterization, and clysterization; herb doctors, milk doctors, gynecologists, movement curers; specialists in private diseases, in the treatment of fistulæ, in the cosmetic art; hair doctors, wine doctors, hernia doctors, etc."

We all understand that this high degree of specialization occurred as the distinguishing feature of the highest civilization ever attained before our own epoch. It was the highest degree of social organization known to other than modern history. This was true, not only of the medicine of that period, but of all the avocations of life. The process of segregation had been carried to its logical limit, until each resultant product was without that potentiality essential for its perpetuation. A cycle in the evolution of the race had been defined—a cycle as clear, as distinct, as inevitable as that which marks the moulting of the dove, the flowering of the rose, or the precession of the equinoxes. Majestic forces operating under resistance had sustained deductions at each successive stage, until motion had practically ceased; and humanity, a trivial plaything in the arcana of nature, was brought to a state of relative equilibration. The heterogeneous had resolved itself into the homogeneous, the specialized had become the generalized, and the inactive the inert, as the world, wrapped in the Lethean mantle of the church, dropped into its long, reposeful sleep. From this sleep the giant of humanity finally awoke, refreshed and surcharged with potential force with which to inaugurate another cycle in the evolutional development of our race. Again we see in the great laboratory of what we are pleased to call civilization the same laws producing the same results under the same conditions. Again do we see the homogeneous undergoing division, and the process of specialization again at work. In illustration of this fact, it is to our present purpose only to speak of our own profession since the breaking of that dawn which shed its most effulgent rays in the dark corners of the cloister. At that period, the church, in its complete dominance, had usurped practically all the functions of society. The church was, in fact, the form and expression of the homogeneity of that somber period. As a consequence, when the work of social segregation was again inaugurated, the healing art was exercised exclusively by the priesthood, which had been the custodian of its secrets during the long, dark centuries. The sons of the monasteries were in those days, in the broadest possible sense, "general practitioners," but the natural process of specialization was again soon manifest in this as in other departments of social evolution. In France, for instance, at the end of the Middle Ages, the work of segregation was manifested by the separation of medicine and surgery. The surgeons were, in turn, further segregated into classes, one of which was composed chiefly of barbers. Other specialties, more or less crude in conception, ill-defined in limit, and inefficient in application, were developed in numbers quite as great as those which characterized the "specialisms" of the Roman epoch. The same evolutional changes were manifest in England and Germany; indeed, all of Western Europe was demonstrating the operation of those sociologic laws, the existence and effect of which I have endeavored to emphasize in your presence today.

But it were impossible and quite aside from my purpose to trace the gradual development of our art along the lines which I have indicated. Modern specialism in medicine—a present product of this process of social segregation—may be said to date from the period when the French schools, in the early decades of this century, took up seriously the question of pathologic anatomy. This was the basis upon which the work of division began. The imitative Germans zealously followed the example of their more progressive neighbors of the South, with the result that, today, the great profession north of the Rhine, through the influence of specialism, has attained a dignity and a distinction which it never before enjoyed. In Great Britain the division of work, scien-

ific and practical, was inaugurated at about the same time, although in this regard, as in others, the profession of our mother country has been very conservative. The United States, during the earlier decades of national existence, was largely controlled by European influence—at first French, then German, latterly English—while today she is thinking for herself and moving for herself, quite independently of foreign initiative, along lines which make for progress. The obstetric art is as old as the function of reproduction, although the latter ages have witnessed its present refinements. It has been said "obstetrics married surgery, and that the fruit of the union was bright-eyed gynecology." The accouchement probably occurred at the time Récamier invented the speculum in 1801. Abdominal surgery had its rational beginning in 1809, under the masterly hand of the immortal McDowell of Kentucky, and must stand as America's conspicuous contribution to surgical progress. Everything in medicine and surgery from that day to this is essentially contemporaneous history, in which occur conspicuously many of our proudest American names. But pardon these references; they are not made to revamp an old story, but rather to give force and illustration to my contention that specialism became a verity in response to natural laws, which even today determine its destiny.

We have come to that point in our discourse when we may with propriety ask: Has specialization today been carried to that degree that its resultant products stand without the potential force necessary for their further perpetuation? Is our science today in the imminence of a fatal equilibration? To each of these inquiries I answer "no." And I say it, too, in the presence of the fact that never before in the history of human activity, neither in Greece nor in Rome, has specialization reached its present degree of refinement. But, happily, the present cycle of civilization is characterized by the operation of forces which found no exemplification in the earlier plays on the great stage of the world. Today, responsive to the edict of the gentle Nazarene, neither cloister, halls, factory, shop, college, school, family nor profession, withholds its modicum of knowledge that may make for the common weal. The proclamation of love heralded from the Mount, today reverberates through the nations. In conformity to natural laws love itself has segregated into emulation, generosity and benevolence. Herein is the corrective tendency of the specialism of today. It is fully exemplified in the proceedings of this and similar organizations, which meet annually to discuss the accumulated knowledge of the year, and then, not only in the convention hall, but through the avenues of the medical press, to lay the matured products of their wisdom, as a freewill offering, upon the common altar of the profession. In this way, knowledge, instead of remaining in the hands of those who evolve it, becomes disseminated for the common welfare. There is not a day but that the general medical profession becomes enriched in resource and potentiality by the accretions derived from specialism. It would seem that in this way one specialty after another must sooner or later lose its distinctive characteristics and return to the great body of the profession from which it was derived. What with our colleges, universities, clinics, hospitals, journals and societies, the connection between the specialties and the general profession is always close and intimate. The characteristic of the present era, one that distinguishes it from former civilizations, is that the process of specialization is never carried to the point of complete segmentation. Each specialty, however assiduously cultivated, remains an integral part of the great general profession, the masters of which must ever stand as our ideals. All specialists today are primarily the products of general medical culture. The act of specialization takes place after and not before entrance into the general profession. When this order is changed, then comes the day of danger. Unlike the specialists of Greece and Rome, those of today are physicians and something more, and happily, their influence is to make something more of physicians. This tendency, which in Germany has come to its fullest fruition, is already marked the world over, But a few decades ago, the practice of gynecology, as now known and understood, was in the hands of a few practicians, to whom it brought compensation and distinction; today it is in the hands of the multitudes, to whom it brings neither. It may be said that the general knowledge of gynecology has gone back to the profession where it belongs. Those who remain practitioners of that department maintain their position by the joint influence of voluntary self-assertion and special adaptability. It is undeniable, however, that with reference to our own department of practice the lines are shifting. From the pelvis to the abdomen was but a natural step in the application of our surgical resource. Those who were gynecologists but a few years ago are, many of them, abdominal surgeons today, with an unmistakeable tendency to become general surgeons tomorrow.

While all this is true, there remains a *raison d'être* for organizations such as this, devoted to the cultivation of special departments of knowledge, and there will continue to remain a reason for the continuance of specialists in each of the recognized departments of medical science and medical practice. This reason is to be found, first, in the highest interests of the general medical profession, and next, in the highest interests of the masses, who are its beneficiaries. From the standpoint of the medical profession, each specialty, as has already been stated, is to be recognized as an integral and organic part, a distinct member controlled by its distinct center in the general sensorium, but a center in thorough correlation with its associated centers. With this idea the development of a specialty is nothing more nor less than the development of a particular part with a particular function—a development which tends in the direction of increasing general efficiency. No matter how generally diffused may become the knowledge of, for instance, gynecology, there will yet remain within the domain of those subjects which are capable of still further development attractive incentive for work. The cultivation of these departments must remain in the hands of those who honestly concentrate themselves upon the task. To such devotees as honestly assume this attitude and its attendant responsibilities, will always be accorded recognition and reward. But the condition which can perpetuate specialism, in this or any other department, is a narrowing rather than a broadening of limits. The broadening of limits tends to ultimate mergence and to homegeneity. A large number, possibly a majority, now identified with special work, may elect to shift their personal activities in this direction, while there are others who, standing upon an equally strong basis of general culture, will

decide to concentrate their energies in carrying to further refinement and perfection a more limited department of science. Thus, happily for the progress of the world, specialism will not disappear from society. On the contrary, specialism is manifestly to be even more distinct than in the past, while specialists, as known to the broad and progressive profession of America, will be able to gain recognition only by conforming to severer tests than are now applied. It is safe to predict, therefore, that in the not distant future there will be fewer specialists, but, happily, better ones. The lines may, and possibly will shift. Existing specialties, or certain of them at least, through the influence of further segregation and final equilibration, may, and probably will, disappear into the general profession, while segmentation will be inaugurated at other points to result in the development of other specialties. Thus shall the great future witness the mutations of progress.

## ORIGINAL ARTICLES.

### A CONTRIBUTION TO THE PHARMACOLOGY OF CANNABIS INDICA.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY C. R. MARSHALL, M.D.

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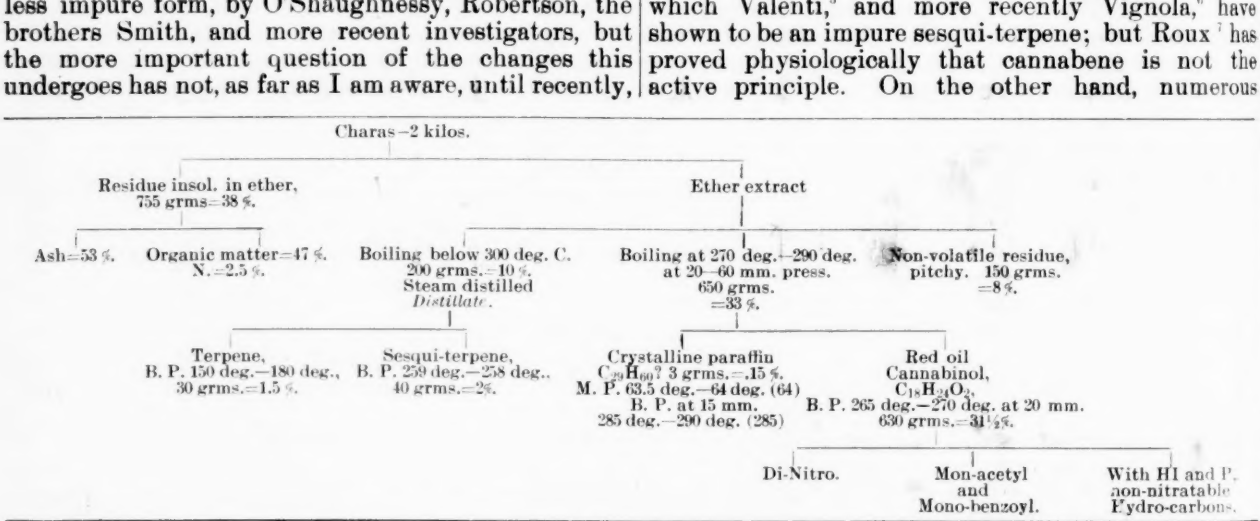
Notwithstanding the large amount of labor which has been expended on Indian hemp, we know comparatively little of its pharmacology. The active principle, it is true, has been isolated, in a more or less impure form, by O'Shaughnessy, Robertson, the brothers Smith, and more recent investigators, but the more important question of the changes this undergoes has not, as far as I am aware, until recently, been attempted. To me this is the most interesting part of the inquiry. Apart from the great financial loss entailed by the growing inertness with age of the drug, the variability in the strength, its preparation has led to numerous misfortunes in medical practice, and a distrust in its use as a therapeutic agent. The isolation of the active principle of the drug would not matter if we could only insure our preparations being of constant strength. But, without knowing the cause of the increasing inertness, this it is impossible to do. With this cause, among other questions, I intend to deal in this paper.

As I have dealt elsewhere [1] with the history of the active principles of Indian hemp, I shall confine myself in this communication to the work of the most recent observers. Two and a half years ago three Cambridge chemists—Wood, Spivey and Easterfield—commenced a re-investigation of the chemistry of Indian hemp. They worked with charas, as being the most active preparation of the plant, and by extraction with organic solvents (alcohol, ether, petroleum ether, etc.,) and subsequent fractional distillation, they isolated a mono- and sesqui-terpene, a crystalline paraffin and a resinous body (cannabinol); an indistillable pitch and an insoluble sandy residue were left behind.[2] The proportions of these substances are shown in the subjoined table, taken from a communication by Easterfield and Wood to the Cambridge Philosophical Society.[3]

Other samples more recently examined have not been found to be so good as this. A second lot contained only 15 per cent. cannabinol; and a third only 10 per cent. Furthermore, the cannabinol from these samples was not so pure as that obtained from the first sample and from the cannabinol obtained from the last the acetyl derivative of a higher homologue of the pure substance has been prepared. This homologue was present to the amount of 10-20 per cent.

The products (with the exception of the paraffin) and certain impure intermediate substances were passed on to me for pharmacologic examination. I naturally turned my attention first to the resin. The terpenes were present in too small an amount, and their chemic constitution and physical character were not such as to suggest a cannabis-like action. Personne,[4] it is true, attributed the activity of the drug to an oily liquid, *cannabene* ($C_{15}H_{20}$), which Valenti,[5] and more recently Vignola,[6] have shown to be an impure sesqui-terpene; but Roux [7] has proved physiologically that cannabene is not the active principle. On the other hand, numerous


Charas—2 kilos.
Residue insol. in ether, 755 grms=38 %.
Ether extract
Ash=53 %.
Organic matter=47 %. N.=2.5 %.
Boiling below 300 deg. C. 200 grms.=10 %. Steam distilled Distillate.
Boiling at 270 deg.—290 deg. at 20—60 mm. press. 650 grms. =33 %.
Non-volatile residue, pitchy. 150 grms. =8 %.
Terpene, B. P. 150 deg.—180 deg., 30 grms.=1.5 %.
Sesqui-terpene, B. P. 259 deg.—258 deg., 40 grms.=2%.
Crystalline paraffin $C_{29}H_{60}$? 3 grms.=.15 %. M. P. 63.5 deg.—64 deg. (64) B. P. at 15 mm. 285 deg.—290 deg. (285)
Red oil Cannabinol, $C_{18}H_{24}O_2$. B. P. 265 deg.—270 deg. at 20 mm. 630 grms.=31½%.
Di-Nitro.
Mon-acetyl and Mono-benzoyl.
With HI and P. non-nitratable Hydro-carbons.

[1] The Lancet, Jan. 23, 1897, p. 235.

[2] Journ. Chem. Soc., Vol. lxix, i, p. 539, 1896.

[3] Proc. Camb. Philosoph. Soc., Vol. ix, p. 148, 1897.

[4] Journ. de Pharm. et de Chem., Vol. xxxi, p. 48 (1857).

[5] Journ. Chem. Soc., Vol. xl, p. 284 (Abst).

[6] Ibid, Vol. lxvii, i, p. 623 (Abst).

[7] Bull. Gén. de Therap., 1886, p. 492.

presence of an impurity seemed improbable. At least it could only be due to a stereo-chemical isomer or a substance with closely allied composition and properties. The possible presence of an alkaloid was avoided by treating the crude drug with dilute sulphuric acid before commencing the investigation. But no alkaloid has been found in charas.

In a more or less impure form cannabinol has been isolated from various commercial preparations, viz.: Merck's cannabinon, extractum cannabis Indicæ etherum, resina cannabis Indicæ, and T. & H. Smith's cannabin.

### PHYSIOLOGIC INVESTIGATIONS.

Experiments have been carried out on cats, dogs, rabbits and myself, and the investigations have been mainly confined to the administration of the various substances by the mouth—a condition necessitated by the comparative insolubility of the drugs. With the experiments in detail I do not intend to deal—admirable descriptions have been given by various observers, both in this and other countries—but in appendix I will be found types of experiments and in appendix II a synopsis of the experiments made. By combining these and referring to the text, little difficulty will be experienced in forming mental pictures of the condition in each individual experiment.

Most of my experiments were made upon two dogs. One was a mongrel puppy something like an Airedale terrier in breed; the other was a young adult fox-terrier. Later a third dog, an English terrier, was added. The first two dogs were of very different temperament; the one (Airedale terrier) was self-reliant and intelligent; the other was affectionate, but nervous to an extreme degree. The English terrier, although timid, possessed much more character than the last one. This question of temperament, I believe, is of considerable importance in dealing with the finer effects of cannabis indica. The cats were adults; the rabbits young, usually 3 to 4 months old.

The *terpenes* in the comparatively small doses in which I was able to give them, produced no noteworthy symptoms beyond slight diuresis. In rabbits there seemed to be slight transient excitement, but the compound given to these animals was impure. On myself 0.5 c.c. produced no effect; 2 c.c. (sesquiterpene) slight and transient listlessness and heaviness of the head.

The *resin*, cannabinol, in dogs constantly produced the same qualitative effect, although it varied slightly in the different animals and in the same animal from time to time. The first noticeable symptom (one-half to two hours) was slight lassitude and an appearance of heaviness about the eyes. Gradually the depression increased and sleepiness and usually sleep followed; yawning and sighing were not infrequent; the body when standing swayed from side to side and this gradually increased until the animal fell over or suddenly pulled himself up with an effort. Usually, after falling, he remained in this position and went to sleep. Sometimes the rocking motion occurred in an antero-posterior direction, especially in the fox-terrier. In this animal, too, the standing position was more characteristic, the hind legs being half bent. In this position and markedly unsteady he usually stood gazing into the fire. Distinct ataxia during walking was present or absent according to the dose. After large doses the attention was blunted, but after small ones no effect in this direction was noticed. After three to six hours the animals began to improve. At this period the larger sometimes became extremely frolicsome and if played with would run about barking in a high-pitched voice. Usually both animals slept or lay before the fire until taken to the kennel for the night.

When under the influence of the drug, the pupils were sometimes slightly dilated, sometimes unaffected, occasionally contracted; the pulse and respiration were slowed, but whether more than could be accounted for by the condition of rest it was often difficult to decide. My general impression is that the pulse was slower than during ordinary sleep. The temperature, with one exception, invariably fell; at the most not more than 3 degrees C., usually not more than 1 to 2 degrees C. The fall naturally varied with the temperature of the room. It was most marked in the fox-terrier, and in this dog trembling was not an infrequent symptom. The reflexes were always present and the sense of pain was doubtfully blunted; the olfactory sense, however, seemed depressed. Vomiting was a frequent symptom; salivation, independent of any emesis, a rare one. In the fox-terrier, increased micturition was occasionally obtained. The influence of dose was not marked. Generally speaking, the symptoms were fairly constant; but owing to the insolubility of the material complete absorption was difficult to insure. Consequently, in dogs at least, a strictly quantitative comparison could not be made. Occasionally a small dose produced more marked symptoms than a larger one, but this was rare, and in the fox-terrier the onset of the symptoms as a rule was later and they lasted longer than in the other dogs. On the whole, however, the symptoms were fairly proportioned to the amount given. After small doses (0.02 g. per kg.) quietude, heaviness about the eyes, sleepiness and usually slight unsteadiness occurred; attention was not appreciably affected, and the symptoms almost passed away in five or six hours. In the English terrier this dose produced a very marked effect, the ataxia being as severe as after much larger doses to other dogs. After large doses (0.1 g. per. kg.) there were marked depression, ataxia, vomiting and sleepiness, although sleep was not an invariable symptom. In the evening food was refused, but the following morning they seemed quite well.

In cats effects similar to those occurring in dogs were obtained, but the action was more severe and prolonged. After a dose of 0.058 g. per. kg. improvement did not commence until after twenty-five hours. The depression and muscular weakness were more marked than in dogs, and salivation was a more constant symptom. Total anorexia and consequent loss of weight occurred after large doses. A detailed description of an experiment will be found in appendix I.

On rabbits preparations of cannabis indica exert comparatively little effect. This was observed by O'Shaughnessy, and it has been noted by more recent investigators. The same effect was obtained in my own experiments with cannabinol. But I am inclined to believe that the immunity is more apparent than real. After large doses, slight depression and quietude are the only observable symptoms, but on further examination a fall in the number of heart-beats and respiration and the temperature was found to occur; the animal refuses to eat and death usually ensues. The low cerebral development of these animals prevents them showing unmistakable signs of cannabis poisoning, and these are only found in observations

on the vegetative functions. The lethal dose, however, is much larger than for dogs or cats.

The effect on myself was very similar to that described by other observers as peculiar to Indian hemp. After large doses (0.1 g.) there was a sensation of dryness of the lips, and of increased viscidity of the buccal mucus, a pleasurable tingling throughout the body, muscular weakness, slight ataxia, risibility and loss of time sensation. My pulse was said to be increased in frequency, sensation was somewhat blunted, and the pupils were slightly dilated.

After small doses (about 0.02 g.) the first symptom was usually loss of power for mental work. A typic condition of mental exhaustion set in. Sentences could not be conceived, except by powerful efforts, and these were not often forthcoming.

After intermediate doses (0.05 g.) the ability to work was lost altogether. I usually sat before the fire doing nothing, almost thinking of nothing. There was a marked unwillingness to move. Pleasurable tingling in the limbs, very slight ataxia and other symptoms similar to those obtained after a larger dose were present. Time passed quickly. Sleepiness was sometimes, but not always, present. As an early symptom a peculiar indistinctness of the periphery of the visual field occurred, and later it was found that the point of regard was made to travel with greater difficulty, as along the line of a page. Depression usually continued throughout the following day.

The residual *pitch*, when dissolved in oil, was active, but much less so than cannabinol. The symptoms were the same. Given in the solid form it exerted little effect. In all probability the activity was due to unchanged cannabinol present. Certain intermediate impure products were tried, but none of these was as active as cannabinol. The insoluble residue was inactive.

### THE ACTIVE PRINCIPLE.

Thus, by a process of elimination, cannabinol was found to be the most active ingredient of the charas products. But in order to determine its comparative activity, control experiments were made with the crude material and extracts obtained from it. The natural product exerted much the same action as cannabinol, but both spirituous and oily extracts were somewhat more active; a similar result was obtained with Merck's cannabinon. This raised the question as to whether cannabinol is the sole active ingredient of the plant. I think we must assume that it is, at least, the active principle. The symptoms produced by the natural product and the resin are practically the same, and this is an important point. It suggests that we must look for changes occurring in the resin either during its manufacture or subsequently; or to a diminished absorbability as compared with extracts of the crude product. That faulty manufacture, etc., will produce a more or less inert substance, will be seen from evidence given later; but I am inclined to attribute to the lessened absorption the more important rôle. The terpenes probably increase the rapidity of absorption of crude extracts, but this I have not yet been able to put to the test. That cannabinol does not possess all the activity of the hemp plant I am prepared to admit; but this is the case with most other crude drugs and their so-called active principles. In the case of charas the terpenes probably aid in its physiologic action, as the crude drug seemed to produce more excitement than pure cannabinol; and when the drug is smoked it is possible that pyrodene and other bases, which are produced by the destructive distillation of the substance, may aid in its intoxicating effects. If any other substance aids in its action, we have at present no indication of it. Moreover, that cannabinol is the chief active ingredient is supported by the fact that the activity of different products is roughly proportionate to the amount of cannabinol they contain, and that the growing inertness of Indian hemp can be explained by changes occurring in this resin.

The question of the purity of cannabinol can only be settled by further research, and this, I may add, is being undertaken. The only demonstration of its purity in the present state of our knowledge, viz: the reconversion of the crystalline acetylized derivative into cannabinol, failed. The acetyl derivative was not crystalline, and the reconverted cannabinol was much less active, physiologically, than the parent substance. This might be explained in many ways, but at present it is idle to speculate.

The last and worst sample of charas yielded a substance which contained a higher homologue of pure cannabinol. This homologue regenerated from its acetyl compound was physiologically inactive. Whether it is active previous to acetylizing is at present impossible to say.

### THE CAUSE OF THE INACTIVITY OF INDIAN HEMP.

The different samples of the same preparation of Indian hemp possess varying physiologic effects, and that good samples darken and deteriorate in keeping has long been known; but until recently no satisfactory explanation of this has been offered. In 1890 Leib Lapin,[8] by means of fractional precipitation prepared a substance which he termed *cannabindon*. This presented the appearance of "a beautiful dark cherry-red mass of thick consistency, which took the form of the vessel in which it stood, and showed a smooth horizontal surface." Its formula he gives as $C_8H_{12}O$. It possessed distinct reducing properties, and rubbed up with chocolate and left a week, its physiologic action was in great part lost. The latter he explains as being due to an oxidation of the preparation resulting from its finely divided state and its contact with fat and air; and he strengthens his position by a reference to the similar behavior of ergot, which undergoes oxidation less readily than cannabindon. The oxidation product he states "is inactive or very slightly active."

Although I was aware of Leib Lapin's views, my own researches were carried out independently. What first drew my attention to the matter was the gradual darkening which cannabinol underwent when left exposed to the air in a test-tube; the darkening commenced on the surface and gradually extended downward; the superficial layers being affected rapidly, the deeper layers very slowly. In order to determine whether this was due to oxidation, and whether in consequence the activity was affected, oxygen was slowly passed through cannabinol kept fluid by immersion in a sulphuric acid bath at 150 to 160 degrees C. The material rapidly darkened and the consistency increased. After passing the oxygen through for six hours the activity was found to be decidedly less. It was then bubbled through for thirteen hours more, the temperature toward the end of the experiment being raised to 185 degrees C. in order to keep the substance fluid. On cooling, the substance set to a

[8] Ein Beitrage zur Kenntniss der Cannabis Indica. Diss. Jurjero, 189

d, brittle mass, exactly resembling pitch in appearce. No loss or gain of weight, within the limits of perimental error occurred. This pitchy material en in the solid form possessed scarcely any action, this in part is due to the lessened solubility and her melting-point, for if previously discolored in a distinct, though comparatively slight, effect is ained. Dr. Easterfield, who has made all the analy- in connection with the charas research kindly dertook one of the oxidized cannabinol. The pertages obtained, compared with those of cannabinol, re:

| Calculated for $C_{18}H_{24}O_2$ (cannabinol) | Found. | Calculated for $C_{18}H_{22}O_3$ |
|---|---|---|
| C=79.4 | C=77.7 | C=75.0 |
| H= 8.8 | H= 7.5 | H= 8.3 |

The product obtained was therefore not completely idized, and the activity it retained was in all probaity due to unchanged cannabinol. As a control periment carbon dioxid was passed through a simi- sample of cannabinol similarly treated. Very ght darkening, probably owing to slight admixture th air occurred, but there was no increase in contency. Only a slight diminution in activity was served.

The influence of temperature was tried. Cannanol distilled at 400 degrees C. under atmospheric essure was found to be slightly less active than canbinol distilled at 265 degrees C. under 20 mm. Hg. essure, but when the substance was heated in sealed bes at 220 to 260 degrees C. for twenty-four hours, very great loss of activity occurred, although this s distinct. As slight oxidation may have resulted ring the process, the influence of temperature *per* may be disregarded. The action of aqueous vapor s not been determined.

It would therefore seem as if the loss of activity of dian hemp was due to oxidation of the active ingrent. The terpenes, like other members of this class, adily hydrolize, and this, doubtless, exerts some fect in the deterioration of the crude drug. The vious remedy is to keep cannabis preparations in r-tight vessels until they can be used. For pracal purposes a well-corked bottle seems to be suffiently protective, but hermetically sealed packages, pecially for transport purposes, are to be prepared. sealed tubes we have kept cannabinol for seventeen onths without the slightest change.

The limitation of the oxidation to the superficial ers probably explains many of the accidents occurng in practice. If the preparation has been long in ck and imperfectly protected, these may have beme comparatively inert, and scarcely any effect may produced, while a renewal of the prescription from eper parts—or the substitution of a more recent eparation—may produce very marked effects. I am rtain that the accidental administration of superial and deep layers of cannabinol will explain some screpancies in my own results, which previously re inexplicable.

As regards a chemical test for the physiologic acvity of cannabis compounds, none exists; and the ly indication at present is in the direction of their ducing power. This will probably give us some formation, and I hope to deal with the question ter. As far as cannabinol is concerned, the transrency is the best ready indication of its purity. hen placed in an ordinary test-tube print ought to read through it with ease; any blackening is due to admixture with oxidized material. If not carefully prepared impure products are readily obtained, and such give no more constant results than the ordinary preparations on the market. The transparency, however, is not an absolute indication of its purity, for the higher homologue of cannabinol, which, when derived from its acetyl compound is inactive, is almost as transparent as cannabinol itself. What the physiologic effect of this compound is in the natural state, it has not been possible to determine.

### SUSCEPTIBILITY.

But the variation in activity of the preparations of Indian hemp will not account for all the differences in effect produced. A difference in individual susceptibility also exists. What this is due to we do not know. It is probable that certain types of men are more susceptible than others, and that certain habits, such as the alcoholic, have an inhibiting influence in this direction. The subject is a difficult one to treat from a purely experimental point of view. In the dogs the greatest effect seemed to be connected with greatest mental stability, but how much of this was due to variability of absorption and how much to individual differences it is difficult to say.

The following case which recently came under my notice is of interest in this connection, as it enabled me to compare the effect of the same dose on myself. A gentleman suffering from neuralgia took ¼ grain extractum cannabis indicæ (B.P.) in the form of a pill. The pills were made up by a well-known London druggist. The following account was written by the patient himself: "At about 4:30 on Sunday, feeling neuralgic pain in the right eye, I took one of the pills. I then had tea and read aloud for some time, feeling nothing unusual. But about 7:30, when dressing for dinner, I began to suffer from very curious feelings. I felt giddy and seemed to lose command of my actions; thoughts seemed to pass rapidly through my brain and I hardly felt responsible for myself. I went to my wife's room and described my feelings. She was alarmed at my appearance and said I was very white. I felt a sort of burning uncomfortable feeling inside and I tried to make myself vomit by drinking several tumblerfuls of hot mustard and water. This was partially successful, but I felt very ill and a doctor was called in. When he came I was unable to speak coherently; sentences were disjointed, and my memory partially failed me. I was ordered to bed and undressed with difficulty. I then shook violently all over, and my hands were cold and tended to contract. I was given some brandy and water and gradually I became more natural. Afterward I took some soup and fish. During my sleep I felt inclined to laugh, but I do not think I actually did so. The next morning I was comparatively well, but throughout this day and the next I did not feel quite well; there was a numbness and coldness in my legs and I feared I was in for an attack of influenza, but my temperature was normal." The neuralgia was cured, but afterward he told me he would rather bear the pain than the effects of the remedy. The remainder of the pills were given to me and on two occasions I tried them on myself. On both occasions the usual effects of Indian hemp were produced, viz., paresthesia in the extremities, inability to do mental work, and sleepiness, but not the giddiness and other symptoms produced in the case cited. The less effect may in part be due to my previous experience,

and the absence of fear in consequence, but this is insufficient to account for all the difference. The prescription was dispensed by a first-class pharmacist and there was no reason to believe that the extract was unequally shared.

### THE ABSORPTION OF CANNABINOL.

For all practical purposes, cannabis preparations may be regarded as being quite insoluble in water, They are soluble in fats and organic solvents generally, but with the exception of fats these are not common constituents of the contents of the alimentary canal. It is even doubtful what part fats play in the absorption of the drug. If Moore and Rockwood's[9] view of fat absorption be accepted, the only influence they could have would be a physical one—the substance would be brought into a state of finer division and thereby rendered more susceptible to other agencies. When given dissolved in oil, the onset of the symptoms is not distinctly earlier than in other cases, but as absorption probably only occurs from the intestine this observation is of little consequence. The more important question is the solubility of the active principle in dilute acids and alkalies respectively. According to Kionka[10] the resin of Indian hemp is insoluble in alkalies. From the therapeutic point of view Germain Sée[11] states that cannabis is the peculiar sedative of the stomach. Both these statements suggest that the active principle is soluble in an acid medium, and this is supported by the fact that cannabinol is actually soluble in strong sulphuric acid and glacial acetic acid. But my results for dilute acids are opposed to this view, and contrary to the statement of Kionka, I find it soluble in dilute alkalies. The following experiment proves this: Two Erlenmeyer's flasks were taken; into one (A) was put 2.127 grammes cannabinol; into the other (B) put 2.335 grammes. Both were left over sulphuric acid until they attained a constant weight; 100 c.c., 1 per cent. caustic soda solution was then added to A and 100 c.c., 1 per cent hydrochloric acid (gas) to B. Both were shaken occasionally and left twenty-four hours. The alkaline solution soon became of a purplish color, which deepened; the acid solution remained perfectly clear. After standing twenty-four hours, both solutions were poured off and the remaining cannabinol was rapidly washed with distilled water until the washings were free from acid and alkali respectively. The flasks were again put over sulphuric acid and left until the weight became constant. The alkali-containing flask (A) had lost 0.03 gramme cannabinol; the acid-containing flask (B) 0.005 gramme, the latter being within experimental error.

It is therefore probable that the cannabis resin is absorbed under the influence of the alkaline juices of the upper part of the intestine. In the mouth, solution occurs to a slight extent, as is evidenced by the peculiar unpleasant taste, but this can not be of practical importance. The influence of other alimentary conditions has not been determined.

The condition of the stomach, however, plays an important part in the time of appearance of the symptoms, probably by hastening or retarding the course of the drug to the intestines. Thus in one case, when the drug was taken on an almost empty stomach, four hours passed before the onset of the symptoms, whereas if taken just before a meal, the first symptoms invariably occurred within one and a half hou Taken after meals the appearance of the first sy toms is variable. In atony and dilatation of stomach cannabis is said to be inactive (as a gas sedative). The small solubility of the drug, even alkalies, probably accounts for the insidious onse the symptoms and its prolonged effect.

### HABITUATION.

In order to determine roughly the influence of c tinued dosage on the activity of cannabinol, the dogs were given very large doses every day for a we A small dose, similar to one given just before experiment, was then administered and its eff watched. The influence was certainly less than the previous occasion, but the diminution was marked. Whether habituation to this remedy occ less readily than with other hypnotics can only determined by practical experience, I know of reliable observations on the subject, although it m be well known. In any case the tolerance is likely to be so great as in the case of opium.

During my experiments with the two dogs, t question of tolerance often presented itself, and was on this account that a third dog was obtain Of the greater susceptibility of this there could no doubt; but to a certain extent it was only app ent. The experience was new to him; he walk about and stumbled when the other dogs would h laid down. The same thing happened in the earl experiments with these dogs; the ataxia was mark later, they learned wisdom by experience, and l down soon after the drug was given. It was oft difficult to get them to stand sufficiently long for a indications to develop.

Although my experiments did not show any gr amount of tolerance, they seemed to me to show so mental depression; the normal physical life of t animals seemed to run on a lower level, although t was difficult of proof. That cannabis indica exert powerful depressing influence, on some individuals least, there can be no doubt, and from experime on myself I have little hesitation in joining the ra of those clinicists who regard Indian hemp as a can factor of insanity. But this point, and others, I h to develop in a later communication.

### EFFECTS ON SPECIAL ORGANS.

Owing to the insolubility of cannabis preparati and the pressure of other work, exact experiments the different organs have not been carried out. solution of cannabinol was made by heating an exc of the substance in a 1 per cent. solution of sodi bicarbonate on a water bath, but the resulting produ which was of a brownish color and probably co tained about 1 in 1000 cannabinol, had no disti influence on blood-pressure. A solution of canna nol phosphate (8 per cent.) in one experiment caus a slight fall and subsequent rise of blood-press but from other points of view this substance was slightly active.

Cannabinol is, however, somewhat depressant the heart. A fall in the number of beats was co stant, and in many cases this seemed greater th could be accounted for by the rest and sleep. Th in the largest dog, a pulse of 108 fell to one of and a slight irregularity, also noticed in rabbits, occ sionally occurred. That the blood-vessels were dilated was inferred from a comparison with the tion of chloral. After this drug, there was not

[9] Journal of Physiology, Vol. xxi, p. 58.
[10] Liebereich's Encyclopedia der Therapie. Erst. Bd. s. 556.
[11] Ibid. s. 557.

ne marked fall in the number of the heart-beats, d the character of the beat was slightly different. er a large dose of cannabinol my own pulse in- ased in frequency; after a small dose no effect was iced; after intermediate doses I invariably forgot take it. No distinct effect on the respiration was served. It was slower and deeper, as in ordinary ep.

In the fox-terrier increased micturition was not in- quent; but this was not observed in the other dogs. onstipation was not an obvious symptom. After con- ued dosage some evidence of it existed, but this s not seen after single doses. In myself it was ely present. Salivation was an occasional symp- m, but as this occurs in dogs and cats after the ex- bition of drugs possessing no specific properties in is direction, it is not probable that cannabinol ex- ts any specific action in this way. In my own case yness of the mouth was a more constant feature.

The main action of cannabinol, however, is on the rvous system, and probably on the cerebral cells. om introspective analysis it is difficult to avoid the nclusion that some peripheral action exists, but as l the symptoms can be explained by a central influ- ce, it is simpler, in absence of proof, to accept this.

One of the most prominent physical symptoms is e loss of time-sensation. This is mentioned by ost writers. But it is not peculiar to Indian hemp, it occurs after mescal button and other drugs of a milar nature. Its explanation, to my mind, is sim- e. The estimation of time is a complex act and pendent upon our calling to consciousness a series events. When the physical state is depressed by ndian hemp a succession of ideas cannot be main- ined; time ceases to exist, and it can not therefore e estimated. Even the apparently slowly travelling econd hands of a watch, which is observed when nder the influence of Indian hemp, may be explained n a similar way. The power of conception is more r less lost; current events are rapidly forgotten, hile those fixed in the memory by older associations ay still be recalled. Under the full influence of the rug, even those too are forgotten, and one's whole revious existence seems to be blotted out.

A most interesting condition, after large doses, is he occurrence, alternately, of loss of control and ucid intervals. During the latter, all the elements f complete sanity are present, but the physical state s below the normal level. In it the processes on hich consciousness depends are readily exhausted, nd the condition of irresponsibleness develops. Slight ental strain during the lucid periods seems to hasten he occurrence of a state of irresponsibility. A more omplete rest from thought brings back the rational ntervals. The over-estimation of distance was never istinctly observed by me, except to a slight degree n one occasion. The effect is probably connected ith the increased effort made to accommodate the cular muscles to the required distance, and is de- endent on deficient will-power. Hallucinations, too, f a very slight character, were only present in one nstance—a result probably attributable to my lack f imagination. In dogs, after large doses, the atten- ion was blunted, and they became less obedient. As ar as I can see, there seems to be no selective influ- nce on any psychical phenomenon. All such proc- sses are depressed, but whether to an equal degree I m not prepared to state. With this question, how- ver, I hope to deal at some future time.

### ILL EFFECTS.

The most common ill effect, or rather after effect, I have experienced, has been depression, lasting the whole or greater part of the following day, after a large dose (0.1g.) This, and the accompanying mental exhaustion, were decidedly painful, and the effect was markedly prolonged by attempts to do an ordinary day's work.

In dogs, vomiting was not an uncommon symptom but this was much less marked than with morphin. A slight, occasional irregularity of the heart in these animals and rabbits, has been mentioned; and a similar condition, viz: an increase in the cardiac irregularity of heart disease has been observed by Prior[12] after cannabis preparations, in men.

### DERIVATIVES OF CANNABINOL.

These have been investigated in connection with experiments on the constitution of this body. Oxycannabin ($C_{11}H_{11}NO_4$) is inactive, at least in moderate doses. Acetyl-cannabinol and the cannabinol regenerated from it were but slightly active. The acetyl compound of the higher homologue of cannabinol, as as well as the substance (regenerated from the acetyl compound) itself, was inactive.

Tri-brom-cannabinol, a brownish powder, was found to possess hypnotic properties. In dogs the action was very slight, but on myself (after 0.1g.) sleep and depression were marked, and three days of mental exhaustion followed.

Attempts were made to obtain a more soluble preparation of cannabinol, and this was best accomplished by making a phosphoric ester. Cannabinol was heated to 100 degrees C. with phosphoric anhydride. The melt was boiled out with alkalies, which dissolved nearly the whole of it, and this was then neutralized by hydrochloric acid. An amorphous substance was obtained, which, on analysis, gave results agreeing with the supposition that it was cannabinol phosphate. Physiologically, however, the substance was not very active, and injected subcutaneously into a dog produced an abscess.

### THERAPEUTIC INDICATIONS.

Therapeutically, cannabinol is likely to be a valuable hypnotic. It is purer and more reliable than the cannabis preparations on the market, but it does not appear to possess any other advantages over them. It is not a powerful cerebral depressant (except in relation to its dose), and belongs rather to the substances termed "sleep producers" than "sleep forcers." Owing to its comparative insolubility its action is prolonged, and this in my own case leads to depression. Its advantages are, that its lethal dose is considerable; it does not inhibit secretory activity; and it does not readily induce habituation. Its disadvantages are, the excitement produced by early doses and the depression which follows its use. It appears to be a slight analgesic, but how far its activity goes in this direction it is impossible, in the absence of experiments in which pain is present, to say. This can only be proved by clinical observation. Purely pharmacologic investigations do not support any other actions of this drug, but so far as they have been carried they do not deny their existence.

In conclusion, I express my thanks to Messrs. Wood, Spivey and Easterfield, for the material supplied me, and especially to Dr. Easterfield for the help he has given me during the progress of the work.

[12] Münch. Med. Woch. No. 33, 1888.

## APPENDIX I.

### TYPES OF EXPERIMENTS.

Descriptions of personal experiments will be found in the *Lancet*. P=heart beat; R=respiration; T=rectal temperature.

*Dog* (English terrier); wt. 7180 grams; P., 102; R., 16; T., 38.2 degrees C.; (room temperature 20 to 22 degrees C.); 12:10 o'clock, 0.14 gram cannabinol; 12:40, slight depression, distinct unsteadiness; 12:45, ataxia more marked, head unsteady, eyes heavy; 12:55, very unsteady, will not lie down, pricked up ears when cart passed window, no dilatation of pupils; 1:10, extremely unsteady, continually falling over; will not touch milk, P. 96, T. 37.7 C.; 1:40, ataxia rather worse, still walking about; 1:50, vomited small quantity, mainly yellowish fluid; 1:54, vomited again; 2:10, condition same, constantly falling over, P. 108, T. 38.6 C.; 2:20, vomited again; 2:30, circus movements, then sat down, got up and repeated several times; 2:40, vomited; 2:50, vomited; 3:10, slightly better, but still falling over, P. 108, T. 38.9 C.; 3:40, been laid down last twenty minutes, slept partly, just got up, ataxia very much better at first but soon developed again; 4:10, sleepy, P. 96, T. 38.5 C.; 4:40, still marked ataxia but much better; 5:15, further improvement, still unsteady and depressed, P. 96, T. 38.9 C; following morning, apparently well. This was the only case in which a rise of temperature was noted.

*Dog* (Airedale puppy), wt. 6500 grams. 10:30 o'clock, 0.5 gram cannabinol given in bread, P. 192; 11:30, lively, no obvious effect; 11:45, sleepy, lay down; 12:30, still in same position, yawning, came when called but seems rather stupid; 1:00, walking about, when played with commenced to run about and bark in a higher pitched voice; 2:00, been asleep for last half hour, does not answer to name so readily, weak on legs, can not stand steadily; 3:00, condition same, asleep, P. 96; 4:00, still asleep, occasionally wakens up, yawns and stretches, will not answer to name; 5:30, condition much the same, still weak on legs and tired, sent to kennel, would not eat; following morning, apparently normal.

*Cat*, wt. 3600 grams. 1:30 o'clock, 0.15 gram cannabinol given in meat; 2:30, no apparent effect; 3:00, sleeping; 3:45, awakened, rather weak on legs, gait slightly unsteady; 5:00, much worse, distinct inco-ordinate gait but does not move about much, has been laid down mostly, with chin on ground, passed a loose motion, would not drink milk although seemed eager for it and only ate two small pieces of meat.

Second day, 9:30 oclock, no apparent alteration, still stupid. would not come when called, distinct muscular weakness, gait still unsteady, pupils somewhat dilated, would not drink milk although a little had been drunk during the night; 2:30, slightly better, gait less unsteady; 5:30, still better, looks up when called, ataxia still present; following morning, seemed quite normal.

*Rabbit*, wt. 620 grams; P., 300; R., 76; T., 38.4 C.

First day, 2:25 o'clock; 2.4 grams cannabinol given in mucilage; 5:25, has been quiet since drug was given, eyelids partially closed, slightly depressed, doubtful muscular weakness; P. 216, R. 30, T. 34.1 C.

Second day, 10:00 o'clock, somewhat worse, head trembles slightly, sensation blunted but kicks on being handled, has not eaten any food, P. 204, R. 54, T. 31.4 C., placed before fire; 5:45, seems slightly better, P. 150, R. 30, T. 32.7 C.

Third day, 12:15 o'clock, condition much the same, trembling of head present, eyes half closed, P. 168, R. 60, T. 29.1 C.; 5:30, slightly increased muscular weakness, pupils more dilated, been laid before the fire all day. P. 204, R. 36, T. 31.8 C.

Fourth day, 11:00 o'clock, no noticeable change, P. 138, R. 39, T. 30.6 C.; 6:00, much worse, trembling very marked.

Fifth day, 9:00 o'clock, found dead, rigor mortis, cold; afternoon, few small petechia in stomach, otherwise normal, stomach and cecum full of food.

## APPENDIX II.

This appendix contains a summary of the experiments made on which the foregoing account is based. Only the briefest description is given, but some attempt has been made to indicate the comparative value of the experiments. The experiments are given in the order they were made. The time in parentheses indicates the period after administration of the drug at which the preceding symptom was noted; m., minute; h., hour.

### EXPERIMENTS ON DOGS.

Three dogs were used; at first only two. All were fed at 9 o'clock A.M. Unless otherwise indicated the individual substances were given in gelatine capsules by the mouth.

1. May 5, 1897; Airedale terrier; weight 3100 gms.; 0.4 cannabinol phosphate; slight depression and sleepiness.

2. June 4, 1897; Airedale terrier, 4400 gms.; 0.4 g. cannabinol phosphate hypodermically; slight depression and sleepiness, fall in pulse rate; longer effect than in last case.

3. June 16, 1897; Airdale terrier, 5400 gms.; 1.1 g. acetyl cannabinol; sleepiness and depression (30 m.), unsteadiness occasional slight excitement, vomiting (3 h.), dilatation of pupils. Quite well next morning.

4. July 1, 1897; Airedale terrier; 0.5 g. cannabinol; slight sleepiness (75 m.), stupidity, muscular weakness and unsteadiness; slept most of day; normal next morning; effect more marked than 3.

5. July 15, 1897; Airedale terrier, 7520 gms.; 1 g. charas; tired, yawning (30 m.), sleepy, ataxia, etc., pupils somewhat dilated, very much excited (6 h.); seemed normal next day; effect somewhat greater than 4.

6. July 22, 1897; Airedale terrier; 0.3 c.c. ⅙ alcoholic extract charas; depression (60 m.), temporary excitement (10 m.), weakness and unsteadiness (most marked 5 to 6 h.), shivering, involuntary micturition; slightly excited next morning; very marked effect.

7. July 28, 1897; Airedale terrier; 1 c.c. ⅙ alcoholic extract charas; lay down (75 m.), but excited if played with; sleepiness, unsteadiness, etc., as in 6, but symptoms less severe; normal next morning.

8. July 30, 1897; Airedale terrier; 0.9 c.c. mono-terpene from charas; no effect.

9. Aug. 2, 1897; Airedale terrier; 1.1 c.c. sesqui-terpene from charas; no effect.

10. Aug. 3, 1897; Airedale terrier; 0.5 g. cannabinol distilled at 406 degrees C. (atmospheric pressure); lay down (30 m.), vomited (55 m.), depressed, head falling to one side (75 m.), afterward sleepiness, unsteadiness, etc., vomited twice (6 h.); effect almost as marked as 4.

11. Aug. 11, 1897; Airedale terrier; 1 c.c. greenish oil, intermediate between sesqui-terpene and cannabinol, unpleasant smell; vomited (45 m.); no effect beyond slight depression.

12. Oct. 19, 1897; Airedale terrier, 9650 gms.; 9.97 g. intermediate product between sesqui-terpene and cannabinol (distils below 300 degrees C.); slight depression, increased micturition; otherwise normal.

13. Fox-terrier, 7550 gms.; 0.75 g. intermediate product between sesqui-terpene and cannabinol (distils below 300 degrees C.); vomited four times (70 to 100 m.), increased micturition; no other effect.

14. Oct. 27, 1897; Airedale terrier, 10,700 gms.; 1.15 g. cannabinol, from Merck's cannabinon; depression (40 m.), sleepiness, muscular weakness and unsteadiness, dilated pupils, vomiting (140 m., 240 m., 255 m.); somewhat better, but still severely affected (5½ h.); would not touch food; apparently well next morning. Most marked effect yet.

15. Fox-terrier, 7950 gms.; 1.04 g. cannabinol, from T. and H. Smith's cannabin. Unsteadiness (35 m.), which increased; became tired and sleepy but walked about much, vomited (4 ¼ h.); more unsteady but less depressed than other dogs; would not touch food; well next morning.

16. Nov. 11, 1897; Airedale terrier, 11,250 gms.; 0.99 g. Merck's cannabinon. No effect (30 m.), usual symptoms marked (60 m.), continued to 180 m., afterward gradual improvement, very much better (6½ h.), salivation (2 h., continued 1 h.), vomiting (2 h.); depression and unsteadiness more marked than 14 but more transient.

17. Fox-terrier, 8100 gms.; 1.04 g. ext. cannab. indic. ether (Merck). Slight effect (60 m.), unsteadiness (75 m.), vomited (3½ h.), ataxia main symptom; not much better (6½ h.); very little sleep, apparently well next morning; effect about the same as 15.

18. Nov. 18, 1897; Airedale terrier; 0.19 g. ext. cannab. indic. ether (Merck). Depression (45 m.), marked unsteadiness (60 m.), slight salivation (90 m.), sleepy, excited, vomited (3 h.), ataxia not much better when left (4 h.).

19. Nov. 22, 1897; Airedale terrier; 1.95 g. cannabinol. Slight effect (30 m.): unsteadiness, sleepiness, etc., developed, but symptoms not more severe than 18.

20. Fox-terrier; 1 g. ext. cannab. indic. (Merck). Commencing weakness (45 m.), more marked (60 m.), afterward became very severe; incontinence of urine, vomited (130 m., 135 m.), trembling from cold; slight improvement (3½ h.).

11. Nov. 26, 1897; Airedale terrier; 0.19 g. cannabinon (Merck) given in a piece of meat. Slight effect (2 h.); distinct unsteadiness (2½ h.), subsequently worse, depressed but not sleepy.

22. Fox-terrier; 0.55 g. extract cannab. indic. Sicc. (Merck). No distinct effect.

23. Dec. 1, 1897; Airedale terrier, 12,400 gms.; 0.15 g. alco-

ol ether extract charas [previously heated three times with dil. $H_2SO_4$]. Sleep main symptom, depression (60 m.), unsteadiness (90 m.), vomiting ($2\frac{1}{2}$ h. $3\frac{1}{2}$ h.); distinct improvement (5 h.).

24. Fox-terrier: 8800 gms.; 0.15 g. alcohol-ether extract charas [previously heated three times with dil. $H_2SO_4$]. Slight depression (35 m.), slight unsteadiness (75 m.), afterward very distinct: slept, salivation (3 h.), vomited (4 h.), not much improvement (6 h.); well next morning.

25. Dec. 3, 1897; Airedale terrier; 0.15 g. alcohol-ether extract charas [previovsly heated 14 hours at 260 degrees C.]. Effects similar to 23, but somewhat less marked and delayed—no obvious action except slight depression and sleepiness for three and one-half hours.

26. Fox-terrier; 0.21 g. alcohol-ether extract charas [previously heated 14 hours at 260 degrees C.]. Slight depression (60 m.), slight unsteadiness (3 h.), much more marked ($3\frac{1}{2}$ h.); improvement ($4\frac{1}{2}$ h.).

27. Dec. 6, 1897; Airedale terrier; 0.15 g. cannabinol rapidly distilled from alcohol-ether extract. No apparent effect (70 m.), later, usual symptoms developed, very distinct unsteadiness.

28. Fox-terrier; 0.54 g. pitch from extract, contains a little cannabinol. Slight depression; no other distinctive action.

29. Dec. 9, 1997; Airedale terrier; 0.15 g. distillation fraction previous to cannabinol than latter. Depression (30 m.), sleepiness, unsteadiness (85 m.), but not marked; attention good, excited ($5\frac{1}{2}$ h.).

30. Fox-terrier; 0.21 g. distillation fraction previous to cannabinol than latter. Mostly laid down at first; slight unsteadiness (2 h.), worse ($3\frac{1}{2}$ h.), slight sleepiness; symptoms not marked.

31. Airedale terrier; 0.21 g. charas extract, further heated for 60 hours at 220 to 260 degrees C. (cp. 25). Depression (60 m.), unsteadiness (105 m.), slept fairly well, much better ($5\frac{1}{2}$ h.); symptoms more marked than 25 but less than 23.

32. Fox-terrier; 0.39 g. charas extract, further heated for 60 hours at 220 to 260 degrees C. (cp. 25). Slight depression and unsteadiness (90 m.), much more marked (2 h.), still severe ($5\frac{1}{2}$ h.), sleepy; symptoms about equal to 24.

33. Dec. 28, 1897; Airedale terrier; 1.07 g. cannabinol (oldest). Laid down at first, could not be induced to stand long; very slight unsteadiness (3 h.) and depression, more severe (5 h.) but still fairly well; normal next morning.

34. Fox-terrier; 1.03 g. cannabinol (oldest). Slight depression (60 m.), unsteadiness (90 m.), still distinct (5 h.); depressed following morning.

35. Dec. 29, 1897; Airedale terrier; 0.92 g. cannabinol, distilled from another sample of charas. Asleep (55 m.), very unsteady (90 m.), continued as long as observed (6 h.); slept mostly.

36. Fox-terrier; 0.96 g. cannabinol, distilled from another sample of charas. Unsteadiness (55 m.), became very marked afterward, vomited (65 m. and 5 h.); slight improvement (6 h.).

37. Dec. 31, 1897; Airedale terrier; 1.1 g. cannabinol (oldest). Slight depression and unsteadiness (70 m.), increased later, slept mostly; more marked effect than 33.

38. Fox terrier; 0.97 g. cannabinol (oldest). Unsteadiness (70 m.), which increased, still marked ($5\frac{1}{2}$ h.); effect greater than 34.

39. Jan. 3, 1898; Airedale terrier; 0.97 g. cannabinol, distilled from another sample of charas. No effect (60 m.), afterward slept, very slight unsteadiness, (2 h.), did not increase, lay down occasionally; slept remainder of day, playful when aroused.

40. Fox-terrier; 0.95 g. cannabinol, distilled from another sample of charas. No effect (60 m.), very slight unsteadiness (2 h.), soon became more marked, continued as long as observed, slept somewhat; slightly depressed next morning.

41. Jan. 4, 1898; Airedale terrier; 1.1 g. cannabinol, distilled from another sample of charas. Slight depression; no marked symptoms.

42. Fox-terrier; 0.99 g. cannabinol, distilled from another sample of charas. Depression and unsteadiness (2 h.) not very marked; slight depression next morning.

43. Jan. 5, 1898; Airedale terrier, 12,110 gms.; 1.03 g. cannabinol, distilled from another sample of charas. Slight depression (60 m.), slight unsteadiness, slept mostly; unsteadiness increased, vomited (125 m.), awakened to be taken to kennel, very unsteady.

44. Fox-terrier, 8210 gms.; 0.97 g. cannabinol, distilled from another sample charas. Slight depression and unsteadiness (60 m.), became more marked and continued as long as under observation ($6\frac{1}{2}$ h.), vomited a little ($5\frac{1}{4}$ h.), slept partly; apparently normal next morning.

45. Jan. 6, 1898; Airedale terrier; 1.01 g. cannabinol, distilled from another sample of charas. Slight depression (60 m.), slept mostly, unsteadiness less marked than 43; apparently well the following morning.

46. Fox-terrier; 0.97 g. cannabinol, distilled from another sample of charas. Slight depression (60 m.), unsteadiness (70 m.), effects similar but ataxia less marked than 44.

47. Jan. 7, 1898; Airedale terrier; 0.98 g. cannabinol, distilled from another sample of charas. Slept most of the time, unsteadiness slight.

48. Fox-terrier; 0.97 g. cannabinol, distilled from another sample of charas. Depression (30 m.), unsteadiness (60 m.), became very distinct, laid down mostly, slept partly; very slight depression next morning.

49. Jan. 8, 1898; Airedale terrier; 1.04 g. cannabinol, distilled from another sample of charas. Depression (60 m.), unsteadiness (90 m.), not further observed.

50. Fox-terrier; 0.99 g. cannabinol, distilled from another sample of charas. No apparent effect (90 m.); not further observed; apparently normal next morning.

51. Jan. 9, 1898; Airedale terrier; 1.02 g. cannabinal, distilled from another sample of charas. Not observed.

52. Fox-terrier; 1 g. cannabinol, distilled from another sample of charas. Not observed.

53. Jan. 10, 1898: Airedale terrier; 1.02 g. cannabinol, distilled from another sample of charas. Depression, distinct ataxia, but not marked; slept most of the time.

54. Foxterrier; 1 g. cannabinol, distilled from another sample of charas. Sleepiness, depression and slight unsteadiness, symptoms less marked than usual; slight depression next morning.

55. Jan. 11, 1898; Airedale terrier; 0.22 g. cannabinol (as 31). No evident effect (60 m.), later transient depression, but no ataxia developed. Compare with 31.

56. Fox-terrier; 0.4 g. cannabinol (as 31). No effect (60 m.), later depression and unsteadiness but less than 32.

57. Jan. 25, 1898; Airedale terrier, 13,150 gms.; 0.21 g. cannabinol (as 31). Slight depression (60 m.), afterward sleepiness, unsteadiness, excited (5 h.)

58. Fox-terrier, 7980 gms.; 0.42 g. cannabinol (as 31). No effect (60 m.), later sleepines, slight unsteadiness and depression.

59. Feb. 11, 1898; Airedale terrier; 0.16 g. third fraction cannabinol dissolved in .64 g. olive oil. Depression (30 m.) followed by sleep, no distinct unsteadiness, excited at times, vomited a little ($4\frac{1}{4}$ h.); still depressed ($5\frac{1}{4}$ h.).

60. Foxterrier; 0.18 g. third fraction cannabinol dissolved in .64 g. olive oil. Depression (35 m.) and sleep, no ataxia observed but could not be induced to stand long; still depressed (5 h.).

61. Feb. 15, 1898; Airedale terrier; 0.16 g. second fraction cannabinol in .64 g. olive oil. Symptoms similar to 59.

62. Fox-terrier; 0.18 g. second fraction cannabinol in .64 g. olive oil. Slight depression and unsteadiness ($2\frac{1}{2}$ h.) but less marked than 60, vomited (5 h.).

63. Feb. 17, 1898; Airedale terrier; 0.16 g. first fraction cannabinol in .64 g. olive oil. Depression somewhat more marked than 61 but no unsteadiness, vomited slightly (3 h.).

64. Fox-terrier; 0.18 g. first fraction cannabinol in .64 g. olive oil. Some depression and slight unsteadiness, but doubtful if as marked as 62.

65. Feb. 22, 1898; Airedale terrier; 0.21 g. cannabinol distilled at atmospheric pressure, then heated 5 hours at boiling point. Slight depression and sleepiness, no ataxia observed; much better ($5\frac{1}{2}$ h.).

66. Fox-terrier; 0.23 g. cannabinol distilled at atmospheric pressure, then heated 5 hours at boiling point. Slight depression, no sleep; almost well ($5\frac{1}{2}$ h.).

67. Feb. 24, 1898; Airedale terrier; 2.1 g. cannabinol distilled at atmospheric pressure, then heated 5 hours at boiling point. Depression and unsteadiness, but symptoms not very marked, slept somewhat, vomited ($3\frac{1}{2}$ h., $4\frac{1}{2}$ h.), slight improvement (6 h.).

68. Fox-terrier; 2.2 g. cannabinol distilled at atmospheric pressure, then heated 5 hours at boiling point. Depression and distinct unsteadiness, did not sleep; somewhat better ($5\frac{1}{2}$ h.).

69. Feb. 28, 1898; Fox-terrier; 0.43 g. acetyl-derivation of higher homlogue of cannabinol. No effect ($2\frac{1}{2}$ h.).

70. March 1, 1898; Airedale terrier; 0.2 g. cannabinol distilled in vacuo. Depression, sleep and unsteadiness, more marked than 67; decided improvement ($5\frac{1}{2}$ h.).

71. Fox-terrier; 0.22 g. cannabinol distilled in vacuo. Distinct unsteadiness (60 m.), slight depression; symptoms similar to 68; much better ($5\frac{1}{2}$ h.).

72. March 3, 1898; Airedale terrier; 0.45 g. pitch dissolved in 1.5 g. olive oil containing some cannabinol. Slight depression and unsteadiness; much better ($4\frac{1}{2}$ h.).

73. Fox-terrier; 1.03 g. cannabinol regenerated from old acetyl compound. Slight depression and sleepiness, no obvious ataxia.

74. March 8, 1898; Airedale terrier; 0.06 g. morphin acetate in capsule. Vomited frothy mucous-like vomit (12 m., 14 m., 17 m.), marked depression, much worse than any previous observation, retching (22 m.), rapid breathing, quick pulse, head-nodding (40 m.), salivation (44 m., continued to 120 m.), still much depressed, constant moaning, slight myosis (130 m.), fall of temperature 1.1 degrees C., sleepiness, slight unsteadiness; improvement (4 h.), but still depressed ($5\frac{1}{2}$ h.).

75. Fox-terrier; 0.1 g. morphin acetate in capsule. No effect (20 m.), head nodding (30 m.), retching and vomiting of frothy colorless fluid (35 m., 38 m., 50 m., 55 m., 90 m., 105 m.), salivation, unsteadiness, depression (130 m.), not sleepy, salivation stopped ($3\frac{1}{4}$ h.), fall of temperature 2.3 degrees C; could not be induced to stand up, somewhat better ($4\frac{1}{2}$ h.).

76. March 16, 1898: 0.93 g. olive oil extract of charas, containing about .2 to .25 g. soluble charas products. Slight depression and unsteadiness (60 m.), sleepiness, vomiting (160 m.), ataxia more marked, excited ($3\frac{1}{2}$ h.), slight improvement ($5\frac{3}{4}$ h.).

77. Fox-terrier; 1.86 g. olive oil extract of charas, containing .4 to .5 g. soluble charas products. Sleepiness and depression (30 m.), distinct unsteadiness (60 m.), which became more marked later, vomited (105 m.); no obvious improvement ($5\frac{3}{4}$ h.).

78. March 18, 1898; Fox-terrier, 8840 gms.; 0.15 g. extract cannab. indic. (B. P.) in pills (from London chemist). No effect (90 m.), afterward depression and marked ataxia, vomited ($2\frac{1}{2}$ h.).

79. March 22, 1891; Airedale terrier, 13,580 gms.; 1.03 g. partly ($\frac{3}{4}$) saponified acetyl derivative of higher homologue of cannabinol. No distinct effect.

80. Fox-terrier; 0.35 g. oxycannabinol. No obvious effect.

81. March 25, 1898; Airedale terrier: 1.02 g. cannabinol. Depression, very distinct unsteadiness (60 m.), sleepiness, vomited (2 h., $3\frac{1}{4}$ h.), no distinct improvement ($4\frac{1}{4}$ h).

82. Fox-terrier; 0.99 g. cannabinol. No obvious effect (60 m.), depression (75 m.), vomiting (105 m., 115 m., 130 m., 135 m., 255 m.), slight unsteadiness (120 m.), symptoms increased; no improvement ($4\frac{1}{2}$ h.).

83. March 30, 1898; Airedale terrier; 1 g. chloral hydrate in capsule. Sleepiness (15 m.), very slight ataxia, somewhat more marked (30 m.); fall of temperature 0.4 degrees C., apparently normal (4h.).

84. Fox-terrier; 1 g. chloral hydrate in capsule. Sleepiness (15 m.), slight muscular weakness but no distinct ataxia; fall of temperature 0.4 degrees C., apparently normal (4 h.)

85. April 5, 1898; Airedale terrier; 0.5 g. chloralose in capsule. Slight depression and sleepiness, transient; fall of temperature 0.5 degrees C.

86. Fox-terrier; 0.0195 g. hyoscine hydrochlorid. Uneasiness (30 m.) followed by whining, dryness of the tongue, dilatation and less marked reaction of pupils to light, increased rapidity of heart beat (60 m.), improvement commenced (2 h.); no fall of temperature.

87. April 11, 1898; 0.21 g. cannabinol. Slight depression, sleepiness and unsteadiness, continued 6 hours.

88. Fox terrier; 0.2 g. cannabinol. Slight depression (30 m.) but not much affected until (90 m.), became very unsteady, sleepiness, incontinence of urine, trembling, vomiting (2 h.); fall temp. 3 degrees C; most marked effect obtained with this dose.

89. English terrier, 7180 gms.; 0.15 g. cannabinol. Less reserved (20 m.), slight depression (30 m.), sleepiness chief symptom, no obvious ataxia; slight improvement (5 h.).

90. April 15, 1898; Airedale terrier; 0.2 g. cannabinol kept in sealed tube since Dec. 12, 1896. Slight depression and sleepiness (45 m.), became much more marked; unsteadiness developed, attention became impaired, vomited (5 h.), then improved.

91. English terrier; 0.14 g. cannabinol, kept in sealed tube since Dec. 12, 1896. Slight depression and very distinct unsteadiness (30 m.), gradually increased until fell over every few steps, vomited (100 m., 104 m., 150 m., 200 m.), slept a little ($3\frac{1}{2}$ h.), much better but still markedly depressed (5 h.; temperature fell 0.5 degree C, then rose 1.2 degree C.

92. Fox-terrier; 0.39 g. cannabinol, through which oxygen has been passed 3 to 4 hours at 150 degrees C. Slightly depressed (45 m.), very slight unsteadiness (60 m.), became somewhat more marked, slight sleepiness; symptoms not severe but temperature fell 1.4 degrees C.

93. April 19, 1898; Airedale terrier, 12,840 gms.; 0.22 g. cannabinol (as in 90), subjected to oxygen for 6 hours at 150 to 160 degrees C. Slight depression and sleepiness (30 m.), increased; distinct unsteadiness; not much improved (6 h.).

94. English terrier; 0.16 g. cannabinol (as in 93). Depressed, restless (20 m.), sleepy (30 m.), slight unsteadiness (40 m.), gradually became worse, but not so bad as in 91; vomited (55 m., 115 m.), somewhat better ($4\frac{1}{2}$ h.), but no further improvement ($5\frac{3}{4}$ h.).

95. Fox-terrier, 8270 gms.; 0.21 g. cannabinol (as in 90). Slight depression (30 m.), but not much affected during first hour, afterward much depressed, slight unsteadiness; no improvement ($5\frac{3}{4}$ h.).

96. April 23, 1898. Fox-terrier; 0.19 g. cannabinol (as in 90). Asleep (30 m.), but no marked symptoms for three hours, then slight unsteadiness, which increased; distinct ($6\frac{1}{4}$ h.).

97. Airedale terrier; 0.22 g. cannabinol through which $CO_2$ has been passed for 20 hours at 150 to 185 degrees C. Slight depression and sleepiness (30 m.) became more marked, unsteadiness (60 m.), vomited (105 m.); afterward improved but still under influence ($6\frac{1}{4}$ h.).

98. English terrier; 0.2 g. cannabinol through which oxygen has been passed for 20 hours at 150 to 185 degrees C., pitchy appearance. Very slight depression and restlessness (30 m.) which quickly (1 h.) passed away; no ataxia.

99. April 27, 1898; English terrier, 7760 gms.; 0.2 g. tribromcannobinol. Depressed (60 m.), slight sleepiness but no distinct unsteadiness, apparently normal (4 h.).

EXPERIMENTS ON CATS.

100. Dec. 11, 1895; 2500 gms.; 3.5 g. charas given in mucilage (65 c.c.), chloroformed during injection. Vomited most of the substance (about 50 c.c.) after recovery from chloroform, depression, weakness, narcosis and death (4 h.); no characteristic macroscopic changes.

101. June 20, 1896; 2600 gms.; 0.15 g. cannabinol in meat. Sleepiness (90 m.), muscular weakness, marked ataxia, stupidity; commencing improvement (25 h.), complete recovery (44 h.).

102. May 26, 1896; 2700 gms., same cat; 0.27 cannabinol as pills with starch. Quiet (90 m.), restlessness and micturition, then salivation ($3\frac{1}{2}$ h.), muscular weakness and unsteadiness, anorexia; improvement (25 h.), almost well (28 h.)

103. June 2, 1896; 1.3 g. cannabinol in capsules. Tired, quiet (60 m.), salivation and unsteadiness (100 m.), marked ataxia, sleepiness, dilated pupils: improvement (30 h.), almost well (53 h.).

EXPERIMENTS ON RABBITS.

Substances were made into an emulsion with gum and injected through a catheter into the stomach.

104. Nov. 1, 1895; 1730 gms.; 0.895 g. impure (sesqui) terpine. Slight excitement.

105. Nov. 4, 1895; 1730 gms.; 0.895 g. charas with sodium bicarbonate. Slight excitement.

106. Nov. 5, 1895; 1730 gms. 0.876 g. petroleum ether extract. Slight excitement.

107. Dec. 17, 1895; 1440 gms.; 1.44 g. charas. No distinct effect.

108. Jan. 16, 1896; 1500 gms.; 3 g. petroleum-ether extract. Became quieter; number of heart beats and respiration, and temperature fell; death occurred on third day.

109. June 5, 1896; 1100 gms.; 2.2 g. cannabinol. Depression (60 m.), sleepiness, fall in pulse (252 to 100), respiration (142 to 18) and temperature (40.4 to 35.7 degree C.), diminished reflexes; improvement (20 h.), much better but not normal (29 h.).

110. June 10, 1896; 930 gms.; 2.2 g. charas. Quieter (90 m.), fall in pulse, respiration and temperature; died on fourth day, cold and marasmus.

11. April 5, 1898; 620 gms.; 2.3 g. cannabinol. Depressed, slight muscular weakness, sleepiness, fall in pulse, respiration and temperature; death, $3\frac{1}{2}$ days.

PERSONAL EXPERIMENTS.

112. Feb. 19; 0.1 g. cannabinol, taken about 2:45 P.M.

113. Feb. 8, 1896; 0.1 g. cannabinol in 0.05 c.c. alcohol and 20 c.c. water. Slight mental depression.

114. March 9, 1895; 0.5 c.c. monoterpene in 20 c.c. water. No effect.

115. March 10, 1896; 0.05 g. cannabinol in 0.1 c.c. alcohol and 20 c.c. water. No distinct effect for 4 hours, then feeling of dryness in mouth, pleasant tingling, slight unsteadiness, happiness, unpleasant visions on closing eyes, time relation not completely lost, feeling of tiredness but no marked tendency to sleep.

116. March 28, 1897; 0.05 g. cannabinol regenerated from acetyl compound. Taken at 8 P.M., retired to bed at 10:30 feeling a little tired, slept soundly till 6 P.M., no distinct effect.

117. April 5, 1897; 0.05 g. cannabinol regenerated from acetyl compound. Taken at 10.30 A.M., slightly depressed in afternoon, no other effect.

18. April 5, 1897; 0.1 g. cannabinol regenerated from acetyl pound. Taken at 11 A.M., tired and sleepy in afternoon.

19. April 10, 1897; 0.2 g. cannabinol regenerated from tyl compound. Taken at 1 P.M., slight dryness of mouth paresthesia (160 m.) followed by sleepiness, depressed ing evening, retired at 11:30.

20. April 13, 1897; 4 cannabinol tablets (a commercial paration) g. cannabinol. Taken at 5:08 P.M., feeling of htness in head (5:55), dinner 6:00, afterward felt sleepy and htly intoxicated; time relations altered but not annulled.

21. June 7, 1897; 0.2 g. cannabinol phosphate. Taken at 30 P.M., Retired at 12 M., no evident effect.

22. June 9, 1897; 0.4 g. cannabinol phosphate. No dis- ct action.

23. June 6, 1897; 0.8 g. cannabinol phosphate. Taken at 45 P.M., 11:40 very sleepy, retired, awoke at 7:20 A.M., feel- very sleepy, depressed all the morning.

24. March 17, 1898; 0.05 g. oily extract of charas, contain- .013 g. soluble products. Dinner at 6:20, taken at 8:00, ght sleepiness and mental exhaustion followed.

25. March 18, 1898; 0.105 g. oily extract of charas, contain- 0.13 g. soluble products. Taken at 6:25 P.M., dinner 6:50, peculiar feeling of lightness in head, continued to work, rather better, 11:00 retired feeling sleepy.

26. March 20, 1898; 0.016 g. ($\frac{1}{4}$ grain) ext. cannab. Ind. P.) pill. Tea 5 P.M., slight indigestion, pill taken at 7:30, :30 no evident effect, 10:35 slight light-headedness, warmth face and mental exhaustion, afterward fell asleep.

27. March 21, 1898; 0.14 g. partly ($\frac{3}{4}$) saponified acetyl rivative of higher homologue of cannabinol. Taken at 5:30 M., no effect.

28. March 22, 1898; 0.1 g. third fraction cannabinol. Taken 5:45 P.M., dinner 6:30, 8:25 feeling of lightness in head and ental exhaustion, continued working, effect passed off in bout :30 m.

29. March 23, 1898; 0.1 g. second fraction cannabinol. aken at 5:45 P.M., dinner 6:45, 7:20 no effect, 9:25 slight dry- ss of lips and lightness in head, seemed to pass off but orse again at 7:43, happy, have difficulty in reading, sleepy, :00 just awakened from a short nap, read a little but soon xhausted, 11:20 retired, 6:45 A.M. awoke, felt well.

30. March 24, 1898; 0.1 g. first fraction cannabinol. Taken 5:45 P.M., dinner 6:45, 7:45 no effect, 7:50 feeling of slight ryness of lips and lightness of head, 8:00 somewhat more epressed, not working well, 8:45 working better. 10:00 still omewhat depressed, 11:30 retired but did not succeed in leeping for some time.

31. March 25, 1898; 0.1 g. cannabinol (oldest). Taken at 45 P.M., dinner at 6:30, 7:30 peculiar light-headedness and ryness of the lips, 7:45 slightly unsteady, parasthesia in head nd legs, heaviness of eyelids, no correct estimation of time, :30 awakened from short sleep, 10:00 rather better but nable to work, 10:30 retired, somewhat depressed the follow- ng morning.

32. March 27, 1898; 0.35 g. acetyl derivative of higher omologue of cannabinol. Taken at 7:30 P.M., no effect.

33. March 29, 1898; 0.05 g. cannabinol pill made 18 months go. Taken at 5:50, dinner at 6:30, 8:30 unsteady symptoms, annot work, estimation of time not so good, 9:15 worse, ener- yless, 10:30 went out for few minutes, improved, 11:00 can ead moderately well but eyelids heavy.

34. March 30, 1898; 0.09 g. Merck's cannabinon. Taken at 45, dinner 6:30, 7:20 lightness in head, loss of time relation, appy, amused, pleasant tingling, etc.; sleepy, 8:00 lay down, lept till 10:30 then retired, awakened (7:00 A.M.) feeling dull nd depressed, lasted the whole morning.

35. April 14, 1898; 0.05 g. opium. Taken at 9:00 P.M., 10:00 no obvious action, 10:05 slight heaviness of eyelids, very lightly tired, 10:20 rather better, 11:10 feel somewhat tired, ead rather heavy, slight sense of "well-being," 12:00 still eaviness of eyes and tiredness of head but have worked fairly ell last half hour, not sleepy; retired, soon fell asleep, awakened at 7:00 A.M. feeling well, pleasant sense of gravity, which continued most of morning; no constipation.

36. April 15, 1898; 0.1 g. cannabinol through which oxygen passed 3 to 5 hours at 150 to 160 degrees C. Taken at 5:45, dinner at 6:30, 9:15 slight visual indefiniteness, slight and tran- sient paresthesia, afterward felt slight incapacity for work but no marked effects, 11:45 not sleepy but retired.

37. April 17, 1898; 0.05 g. cannabinol sealed up since Dec. 28, 1896. Tea 4:30, drug taken 5:45, 6:50 slight mental exhaustion and feeling of lightness in head, 7:20 rather sleepy, 8:00 trying to read but have little energy for anything, 9:00 condition same, no estimation of time, feeling of warmth in face and head, 10:00 sleepy, retired.

38. April 21, 1898; 0.065 g. same cannabinol treated with oxygen for 20 hours at 150 to 185 degrees C. Taken at 5:45, dinner 6:40, 8:05 slight feeling of lightness in head, 9:30 have been reading some time, at first had a little difficulty, now feel quite normal.

39. April 22, 1898; 0.05 g. same cannabinol treated with $CO_2$ for 20 hours at 150 to 185 degrees C. Taken at 5:50, dinner 6:30, 7:00 commencing light-headedness, 8:00 more distinct, a want of energy, 9:45 condition same, trying to read, 10:00 not able to do any work, 10:45 no improvement, retired.

40. April 24, 1898; 0.1 g. tribrom-cannabinol. Taken at 8:00 P.M., supper at 8:30, 9:30 slightly sleepy, 11:00 sleepy, no other peculiar effect of cannabinol, retired, slept till 6:45, depressed, suffered from mental exhaustion during three following days.

41. May 4, 1898; 0.065 g. oxycannabinol (as in 38) dissolved in oil. Taken at 5:45, dinner at 6:30. 7:15 went out for a walk, 8:15 arrived home, slightly tired, peculiar feeling in eyes and head grew slightly worse and continued the whole evening, but was insufficient to prevent me writing; 11:10 retired, slept soundly, 6:40 A.M. got up, felt sleepy.

42 May 6, 1898; 0.1 g. charas (best). Taken at 5:45, tea at 4:30, dinner at 7:00, 7:00 slight effect in head, worked in garden, felt want of energy, 8:30 influence more marked, agreeable heaviness of eyelids, very little energy, 10:00 retired, condition same, slept well, depressed following morning.

43. May 12, 1898; 0.016 g. ($\frac{1}{4}$ grain) ext. cannab. Indic (B. P.) in pill (cp. 26). Taken at 5:50, dinner at 6:30, 7:25 lightness of head, peculiar feeling about eyes, 7:50 pleasant tingling in face and feet, no other marked effect, reading fairly well, 8:40 tingling still present, unable to read with benefit, can not calculate time very well, symptoms continued throughout evening, became sleepy but managed to do some copying, 12:30 retired, 7:30 got up feeling tired but soon well.

44. May 19, 1898; 2 c.c. sesqui terpene taken in weak mucilage. Taken at 12:45, lunch 1:10, 1:15 slightly listless and slight heaviness of head, which soon passed away.

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# THE THERAPEUTICAL ECONOMICS OF OPEN COMPOSITION.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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There is only one restriction upon the character of medicines supplied to the public, to be expected at the hands of the law-makers in the period now before us, namely: restriction, with the intent to put a stop to concealment of composition and identity. That legal restriction to this effect may be instituted in some of the States at any time, and is likely to become prevalent, appears manifest from the temper of the law-making mind, shown in various ways, especially in the scope of the enactments against adulterations. Any alteration of composition is prohibited if it be not made known to the purchaser (or consumer), but is allowed if it be so made known. Various irregular admixtures are specifically authorized upon the one condition that they shall be explicitly announced on the label. On the other hand, various colorings and facings of food, which are harmless in themselves, are prohibited because they tend to deceive the consumer as to identity or quality of the article. The same intent appears in legal rulings for uniform standards of concentration of foods and of medicines, and it appears in the early requirements of poison-labels, lately extended, in some instances, to proprietary mixtures sold without a physician's order and without any account of contents.

Granting that some of these prohibitory measures have been worked for as a means of protection to certain industries, and that in other cases the legislation has been proposed by unscrupulous persons, who seek opportunity to levy bribes, etc., it still remains true

that the laws already enacted in this direction have been made possible by a prevailing conviction in the minds of common-sense people, holding as they do, the ultimate balance of power in legislation, that it is dangerous to leave covers of concealment over articles of medicine or food in the market. The average intelligent citizen, and the average plain man of the law, when the question is put fairly before him, will say without hesitation that medicines sold in packages, without the direction of a physician, ought to be compelled by law to bear a statement of their contents in terms known to science. This average man of sense will maintain that it is no affair of the State whether an article of medicine purchased in the market be pharmacopeial or not, made by patented or concealed processes or not, trade-marked by a proprietor or not, monopolized in production or not, but that it does matter to the man who is to take the article of medicine or give it to his child, whether or not he shall be informed what the article really is, in terms such as any physician or pharmacist could define and interpret; and furthermore, that the right of the man to this information might well be made an affair of the State. In fact, the layman is likely to enforce a classification of therapeutic agents, more simple than any of the systems known in pharmacology, a mere division of medicaments into the knowns and the unknowns. And legislative enactment is more than liable to separate the one of these divisions from the other "as a shepherd divideth his sheep from the goats," when these matters are brought into judgment.

With this outlook, therefore, the concern of this brief paper is not one of professional ethics, but rather one of social economics. Neither the physician nor the pharmacist has any economic interest in the use of secret remedies, or any reason to delay prohibitory measures against secrecy of composition. The custom of medication by remedies named from the diseases they are alleged to cure is a custom that has no actual use for pharmacists or physicians at all.

The physician within whose function it falls to select remedies and confine their application to certain needed results, may, in his discretion, either countenance or discountenance secrecy of composition. He is liable to think little of his responsibility in this matter, because while he is acting as an expert for his patient the latter has no need to be informed of the contents of medicinal mixtures. For his own judgment, the physician may believe himself able, in some cases, to arrive at the character of a medicine without a statement of its contents, and may avail himself of the convenience of a ready-made secret mixture, which thenceforth holds the benefit of his approval.

The pharmacist, on the contrary, is not to judge of the selection and application of remedies of his own knowledge as an expert, neither is he to question his patron's choice among various systems of medication. So long as articles of concealed composition are not made contraband in law, it is difficult for the pharmacist to refuse to furnish them, especially difficult when they are directed by physicians. He can only do so upon the ground that such articles can not be made subject to record, as to the identity and quantity of the distinct agents they contain, therefore, he can have no check upon them and will not supply them.

While secret medicines are tolerated by the laws, the physician or the pharmacist has but limited responsibility for their use, little influence as to the employment one way or the other. If he do not go beyond his proper province, the secrecy of remedies is not of his doing, nor can he stop the use of these articles by the people. But both the physician and the pharmacist have marked influence, as authorities in regard to medicines in use, and have influence upon law-makers as to legislation in the question of open composition by the demand of the law.

A policy of prudence, and of courage as well, with a careful study of the bearings of every legal provision proposed on the part of the staunch men of medicine and of pharmacy, can do most effective service in behalf of better economies in medication.

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## THE MODERN INTESTINAL ANTISEPTICS AND ASTRINGENTS.

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The last decade has been very fruitful as regards the introduction of intestinal antiseptics and astringents. To comprehensively describe each and every one introduced during this period, would be beyond the scope of a paper the reading of which will not prove tiresome to the listeners. I will therefore confine myself to those which have made their first appearance during the past five or six years. The modern intestinal antiseptics and astringents belong chiefly to one of two classes of preparations: derivatives of tannic acid, or salts of bismuth. The former will be alluded to first, the articles being described in the order of their introduction into the materia medica.

Among internal astringents tannic acid has long occupied a prominent position; but it has a number of serious drawbacks, chief among which is that it acts undesirably on the mucosæ of the mouth and stomach, where the larger portion of its effect is expended before the remedy reaches the intestines. Prolonged administration of tannic acid, furthermore, is known to be productive of gastric disturbances—anorexia, pain, nausea, and even vomiting. With a view to obviating these disadvantages, experiments have been made with various derivatives of tannic acid, resulting in the production of a number of eligible compounds.

*Tannin albuminate* was the first preparation introduced, which has a less disagreeable taste than the acid itself and acts less vigorously on the stomach; but owing to the fact that it is largely absorbed in the latter organ, its astringent action becomes to a great extent lost to the intestine, and for this reason the remedy has been practically abandoned as an antidiarrheal. The dose in which it was given is from 5 to 20 grains in cachets.

*Tannigen* was the next preparation brought forward which, with a few of its congeners since introduced, is not acted upon to any great extent in the stomach and manifests its astringent action chiefly on reaching the slightly alkaline (in health, but in morbid conditions, vastly increased alkaline) secretions of the intestine, where a gradual and equable decomposition ensues and continues to the end of the gut. Tannigen was introduced by Prof. Hans Meyer of the University of Marburg, Germany, in the fall of 1894 (see *Deutsche Med. Woch.*, 1894, No. 31). It is known

mically, as diacetyltannin, and has the formula $H_4(CH_3CO_2).O_9$. Its formation is based on the placement of two hydrogen atoms of tannic acid by molecules of acetyl. It occurs as a light-gray, ghtly hygroscopic, practically odorless powder, of a lky and faintly astringent taste; soluble in alcohol, d in dilute solutions of the alkalies or their phos- ates and carbonates; insoluble in cold water and in uted acids.

The first to put tannigen to a clinical test was Prof. Müller of Marburg (*Deutsche Med. Woch.*, 1894, . 31). He found it specially serviceable in chronic testinal catarrhs, in which improvement was noted, ually in a short time, from doses of from 3 to 8 rains three times daily. The next report was from rl Künkler of Bonn (*Allgemein Med. Central-Zei- ng*, 1894, Nos. 13 and 14), who used tannigen in me forty cases, covering chiefly chronic diarrheas of rious origins and occurring mostly in children. To ults he gave 3 to 8 grains, to children 1½ to 3 grains, ree or four times a day. The results as a rule were ghly satisfactory, and in some cases a prompt cure s effected. It is advised to continue the adminis- ation of the tannigen for some time after the disap- arance of the catarrhal symptoms, to guard against lapses. D. De Buck of Ghent reports (*Belgique édicale*, 1895, No. 37) prompt results from tannigen acute inflammatory conditions of the intestine, and beneficial though less speedy effect upon chronic tarrhs. Prof. Escherich, of the Pediatric Clinic of e University of Graz, gives a detailed report (*Thera. Woch.*, March 9, 1896) of his experience with tanni- n. His results are described as excellent in suba- te and chronic intestinal catarrhs of children, char- terized by mucous stools. In the former category cases often as early as on the second day of treat- ent, there was a marked diminution in the quantity the mucus in the stools, and in a few, after several ys the evacuations assumed a normal character. In e chronic cases no such remarkable results were ob- ined; yet, in the commencement of the treatment at ast, the decrease of mucus and the dry character of e passages was always noted. It goes without say- g, that an appropriate dietary was strictly observed every instance. In acute intestinal catarrh, with atery, projectile stools, as well as in the beginning follicular enteritis, the results were inferior to those calomel and bismuth subnitrate. As regards ad- inistration, Escherich prescribed 4 grains in infants p to 1¼ years, and 8 grains to older children, from ur to six times a day, mixed with the food. Injuri- us after-effects, or disturbance of the appetite or igestion, were never observed. Numerous additional eports are extant, chief among them being those of Richard Drews of Hamburg (*Allgemeine Med. Cen- al-Zeitung*, 1895, Nos. 35 and 36); Professor Biedert f Hagenau (*Therapeutische Woch.*, 1896, No. 12); W. Kölzer (*Jahrbuch für Kinderheilkunde*, 1898, pages 50-370); and the American physicians, G. A. Hewitt f Philadelphia (*Medical Bulletin*, 1896, No. 1), E. W. Bing of Chester, Pa. (*Medical Times and Reg- ster*, Sept. 22, 1893), and H. A. Griffin and V. H. Norrie (*Daily Lancet*, March 30, 1896.)

The writer has found tannigen a mild yet efficient ntidiarrheal in catarrhal enteritis and in catarrh of he large intestine, particularly when characterized y copious mucous dejections. As a rule, untoward ffects were not observed. At times tannigen leaves a strongly astringent sensation in the mouth, which renders it impossible to administer the remedy to some children; then again, it is occasionally vomited by sensitive children. The simultaneous administration of pepsin often corrects this. In the writer's opinion tannigen is contraindicated in pronounced inflamma- tory diseases of the intestine accompanied by profuse effusion of serum into it. In cases of the secretion of a thin, serous fluid, such as results from acute irri- tation of the upper part of the intestinal canal, it is of little service. It is particularly the lower portion of the intestinal canal that reacts well to tannigen. The amount of mucus is diminished at once, and its over-production does not recur unless the use of the remedy is discontinued too soon. As a consequence, not only are the irritated state of the mucous mem- brane and the particular cause of the disease over- come; but the loss of the nitrogenous material and the heightened peristalsis are reduced, and the absorption of water and nutrient matter in the large intestine is promoted. But this is not all that tannigen and its congener, tannalbin, accomplishes. In spite of the paucity of clinical evidence, it can hardly be denied that tannin has a certain disinfectant power by im- peding bacterial development; as with alkaloids, so with numerous bacterial poisons, such as toxalbu- mins, it unites to form insoluble, and consequently non-poisonous, compounds, as is shown in Cantani's treatment of cholera. Tannigen occasionally colors the stools black.

As regards dosage, large quantities are preferable and more reliable; for children under one year of age, up to 4 grains every two hours for a few doses and then from four to six times a day; for older children, from 5 to ten grains; and for adults 15 grains, or even a few 30-grain doses followed by 15-grain ones every four hours. Tannigen has a tendency to "cake"; hence it is best to dispense it with, say 1/10 its weight of silica or some other insoluble and inert substance. In painful conditions 1 grain of powdered opium, or, in cases where this drug is illy borne, ¼ grain of codein, is a necessary addition; for tannigen and its congeners of the tannin series are not capable of arresting severe pain or violent tenesmus. It is best taken, triturated as above indicated, in a little glycer- ated, freshly boiled water.

*Tannoform* was the next tannin derivative brought forward, a condensation product of formaldehyde and nutgall tannin. Chemically it is methylene digallate, and its composition is represented by the formula

$$CH_2\begin{cases}C_{14}H_9O_9\\C_{14}H_9O_9\end{cases}$$

It occurs as a pinkish, light, odorless, tasteless powder, insoluble in water or acidulated fluids, but soluble in alcohol, ammonia water, and sodium hydroxide or sodium-carbonate solution.

Tannoform was introduced by Prof. J. von Mering (*American Medico-Surgical Bulletin*, 1896, p. 137) as a remedy for hyperidrosis, bromidrosis and "weeping" eczema. The physiologic fact that the preparation is but slightly attacked by the gastric juice and decom- posed into its components chiefly on reaching the in- testine, led to its employment also internally, as an intestinal disinfectant and astringent. Von Mering found tannoform quite effective, particularly in chronic catarrhs; and De Buck and De Moor substantially confirmed his results (*Belgique Médicale*, 1896, No. 33). These clinicians employed doses of 8 grains three or four times a day; to children 4 grains was

given with an equal quantity of peppermint-oil sugar, and taken with tea, milk or chocolate.

Though recommended by the above-quoted authorities in chronic intestinal catarrhs, tannoform does not appear to have been employed to any great extent in the capacity of an anti-diarrheal. The next report on it appeared first in the summer of 1897. It was by M. Eberson of Tarnow, who used the remedy with success in 15 cases of chronic intestinal catarrh. (*Aerztlicher Centralanzeiger*, 1897, No. 26.) Carl Sziklai (*Therapeutische Woch.*, 1897, No. 41) reported having used tannoform in 40 cases of intestinal catarrh in children, with failure in but one case. Considerably smaller doses were employed than von Mering had advised, 1/6 to 3/8 grain every two hours. The only other clinical report extant is by J. Braun of Mokrin, who detailed his results in acute diarrheas of children, and in simple and tuberculous diarrheas of adults (*Therapeutische Woch.*, 1897, No. 46). In the former cases he gave 8 grains every two hours until relieved; and to adults 15 grains was administered four or five times a day. Braun highly lauds the action of the remedy, without referring to any untoward accessory influence of the medication. Prof. R. W. Wilcox stated editorially in a recent issue of the *American Journal of the Medical Sciences* that his observations seem to indicate that tannoform is too irritating for internal use; and this opinion the writer shares. Tannoform appears to decompose partly in the stomach, in pathologic conditions of the gastro-intestinal tract, and the liberated formaldehyde in its nascent state is calculated to irritate the gastric mucosa. Tannoform had best be confined to external application; and the writer of this paper can warmly recommend it as an efficacious antihidrotic and siccative antiseptic.

*Tannalbin* was the next tannic-acid compound introduced as intestinal astringent. It is tannin albuminate rendered insoluble in the gastric juice by heating it at a temperature of about 120 degrees C., and washing the resulting product with diluted hydrochloric acid and with alcohol. It occurs as a light-brown, odorless, tasteless powder, containing approximately 50 per cent. of tannin. It is insoluble in water or acidulated fluids, but soluble in alkaline solutions. Of the various newer intestinal astringents tannalbin has been the most extensively reported on, and appears to be the ideal form of tannic acid for internal administration in inflammatory affections of the intestines. The advantages claimed for it over uncombined tannic acid by the first investigators of its physiologic action—insoluble in the gastric juice of normal stomachs, and consequently causing no disturbance of that organ; slowly and equably decomposed by the intestinal fluids, thus manifesting its astringent action gently but persistently throughout the entire intestinal canal—seem to have been fully confirmed by extensive clinical experience; and the writer can unqualifiedly recommend tannalbin in all cases of intestinal trouble where tannic acid is indicated and calculated to be of benefit. Tannalbin was introduced into therapy by Prof. R. Gottlieb of the Pharmacologic Institute of the University of Heidelberg, in the spring of 1896, and first employed clinically by R. Von Engel, senior physician of the Moravian Provincial Hospital in Brünn, Austria, who reported his results in 40 cases in the *Deutsche Med. Woch.*, 1896, No. 11. An excellent effect was observed in the entire group of chronic intestinal affections, and the results obtained in simple catarrhs of two to seven weeks' standing are designated as surprising. In such cases from 45 to 60 grains per day for a day or two, usually sufficed to check the diarrhea, after which daily doses of from 15 to 30 grains for a few days or weeks longer effected a permanent cure. Of 12 patients with phthisis 11 were cured of the diarrheal complication; and of 10 cases of acute intestinal catarrh 9 were promptly checked by tannalbin. In profuse acute diarrheas of a functional or catarrhal nature the remedy was given every two hours, or even every hour for three or four doses. As a rule the treatment was continued for from two to four days when the desired effect was usually attained. In toxic or infectious enteritis, in dysentery and in cholera-morbus, it had better be avoided. Von Engel never observed disagreeable or injurious by-effects, not even on continued large dosing for weeks, nor did he notice any aversion to taking the tannalbin. The form of exhibition was in powder without any vehicle. The second clinical report on tannalbin is by Prof. O. Vierordt of the Medical Polyclinic of the University of Heidelberg, who used the remedy both in children and in adults in some 30 cases (*Deutsche Med. Woch.*, 1896, No. 25). It was always gladly taken and no effect on the tongue, the stomach, or the appetite occurred even on long-continued dosage of 2½ drs. daily. Those cases were primarily selected which had not proven amenable to dietetic measures nor to the usual medication. Most of these were subacute and chronic enteritic catarrhs, 5 were of tuberculosis, 6 of renal origin, 1 from pelvic sarcoma and 5 of acute enteritis. In all these various diarrheas thorough and prompt antidiarrheal action was manifested by the tannalbin. Its markedly distinctive feature, as compared with the older intestinal astringents, was found to be its equable and uniform action throughout the entire gut. In view of his experience, Vierordt places tannalbin unconditionally ahead of all preparations, tannigen included. As regards dosage, he recommends starting, in adults with from 8 to 15 grains four times a day; and to increase the dose rapidly after the first twenty-four hours if the action be found insufficient up to, say 30 grains per dose and 2½ drams per day. When a sufficient action has been sustained uniformly for a number of days in simple enteric catarrhs, the daily amount may be gradually reduced, if the condition continues satisfactory, until nil is reached. For children beyond the first year the smallest initial dose should amount to 15 grains a day. Vierordt administered the tannalbin either between or immediately after meals, with a spoonful of sterilized water or milk, or with gruel. T. G. Rey of Aachen, Prussia, is a strong believer in the powers of tannalbin (*Deutsche Med. Woch.*, xxxiii, page 46). He used it in 68 cases of diarrhea, chiefly in children under two years of age; among them 33 cases of cholera infantum and 12 of acute catarrh of the large intestines. In all the former the tannalbin was combined with frequent small doses of calomel (1/20 to 1/12 grain every two hours), to intensify the deficient antiseptic action of the tannalbin up to the requisite point: and with this combination it is claimed every case of gastro-enteric trouble in nursing infants can be positively cured, excepting, perhaps, certain peculiarly fulgurant attacks of cholera infantum and the tuberculous form of chronic enteritis. A peculiar beneficial action of tannalbin on the stomach has been observed by Prof. W. H. Porter (*Post-Graduate*,

v., 1897. Its free administration will often arrest the perabundant outpouring of mucus, precipitating mucus and thus destroying one of the favorable dia for the growth of micro-organisms. In this nner it very decidedly aids in overcoming the so-lled hyperacidity of the contents of the stomach. mong others who have reported on tannalbin the llowing may be mentioned: K. Holzapfel, of the edical Polyclinic of the University of Strassburg *Deutsche Med. Woch.*, 1896, No. 50); Scognamiglio Naples (*Wiener Medicinische Blätter*, 1897, No. 2); seph Friedjung of the Pediatric Clinic of the Uni-rsity of Berlin (*Jahrbuch für Kinderheilkunde*, v, No. 1); J. Czemetschka of the Medical Clinic the University of Prague (*Wiener Med. Presse*, 97, No. 22); Hans O. Wyss, of the Children's Hos-tal of Hottingen, Zürich (*Correspondenzblatt für hweizer Ärzte*, 1897, No. 15); L. Roemheld, of the ediatric Clinic of Professor Vierordt at the University Heidelberg (*Münchener Medicinische Wochen-hrift*); W. Koelzer, of Professor Heubner's Clinic the University of Berlin (*Jahrbuch für Kinder-ilkunde*, 1898, p. 280); and the American physicians, eonard Weber of New York (*Post-Graduate*, Nov., 97); Max Einhorn of New York (*ibid.*); T. V. Smith Westfield, N. J., and Hermann T. Wolff of Marion, exas.

Tannalbin has met with more than ordinary atten-on and favor by the medical profession. The writer s found tannalbin particularly efficacious in mucous tarrhs of the intestinal tract; and chronic catarrhs the large intestines yield very promptly indeed. ike tannigen, in acute infectious diarrheas, accom-anied by profuse effusion of serum and severe tenes-us, tannalbin is likely not to prove effective alone, r it has not pronounced disinfectant power, nor has as is to be expected, any distinctly anodyne effect; painful conditions, therefore, some codein or other piate has to be associated with it. Tannalbin, owing its perfect insipidity, is willingly taken by the ost sensitive patients, and in the writer's experience as never been productive of vomiting. Tannigen, n the other hand, while practically equally effica-ous, not infrequently leaves a strongly astringent nsation in the mouth, which renders it impossible administer it to some children; and occasionally it rovokes vomiting, an effect never observed by the riter to follow the administration of tannalbin. It ppears that tannigen is decomposed to an appreciа-le extent in the stomach, and in this way is quite pt, on being pushed or long continued, to induce astric disturbance. In certain chronic conditions he writer has given tannalbin daily for weeks with-t causing, as far as could be observed, any digestive erangement. In infectious diarrheas of children, in hich tannalbin or tannigen alone is not effective, ood results can be obtained by a combination with the urely disinfectant remedies, betanaphthol benzoate benzonaphthol) or calomel; the former in doses of om 1/20 to 1/10 grain. As regards administration, nnalbin is best taken with glycerinated sterilized ater.

*Tannopine*, the newest tannin compound introduced s an intestinal astringent, is what was first called annon. It is a condensation product of three mole-ules of tannic acid and one molecule of hexamethy-enetetramine (known by the various trade names urotropin," "formin," etc.). It contains 87 per cent. f tannin. It is described as a grayish-brown, odor-less, tasteless, non-hygroscopic powder; insoluble in the ordinary solvents and diluted acids, and slowly soluble in alkaline fluids, analogously to tannalbin. The only clinical report thus far met by the writer is by E. Schreiber, of Professor Ebstein's clinic in Göttingen (*Pharmaceutische Centralhalle*, 1897, p. 839). In doses of 15 grains for adults and from 3 to 8 grains for children, three or four times a day, tannopin never produced untoward effects. Good results were obtained specially in tuberculous enteritis, and next in order in subacute and chronic non-tuberculous intestinal inflammations, both in adults and in children. Tannopin is decomposed more slowly by the intestinal fluids than is tannalbin or tannigen, and hence, it is claimed, exerts a more prolonged astringent effect on the intestinal mucosa. At the time of this writing tannopin was not as yet obtainable on the American market.

*Tribenzoylgallic acid* is probably the latest addition, in the line of purely organic compounds, to the ever-growing list of intestinal astringents. It was introduced by W. Cohnstein of Berlin, and has thus far been reported on only by W. Koelzer (*Jahrbuch für Kinderheilkunde*, 1898, pp. 280-307), of Professor Huebner's Pediatric Clinic connected with the University of Berlin. The new substance is described as colorless (or white), odorless and tasteless, insoluble in water, but readily soluble in hot alcohol or in alkaline solutions. It appears to be unaffected by keeping or by the saliva or gastric juice, for it reaches the intestines, when the stomach is in a normal condition, practically undecomposed, and is there disassociated, gallic acid being liberated and exerting its specific astringent action, while the rest remains physiologically inert. According to Koelzer, tribenzoylgallic acid acts similarly to tannalbin and tannigen, but in a lesser degree. He administered the remedy to infants in doses of 15 grains four times a day, and at times he even gave single doses of 30 grains repeated once or twice at two-hour intervals. The writer has not had an opportunity to test tribenzoylgallic acid, as the remedy was not obtainable on the American market at the time of writing; and the chemico-physical description above given is taken from the preliminary announcement of the manufacturer. This ends the list of the tannin derivatives introduced as intestinal astringents and antiseptics during the last decade.

*Bismuth subgallate*, also known as "dermatol," is the first of the various bismuth compounds to receive our attention. It is a basic gallate of bismuth of the formula $Bi(OH)_2.C_7H_5O_5$. It occurs as a canary-yellow, heavy, odorless, non-hygroscopic, almost tasteless powder, containing 55 per cent. of bismuth oxid. It is insoluble in the ordinary solvents, but dissolves in sodium hydrate solution without separation of bismuth hydrate, which behavior distinguishes it from other bismuth salts. Bismuth subgallate does conglutinate and get lumpy, and is indifferent to light and air. Though first described in 1841, bismuth subgallate was not employed therapeutically until 1891, when Heinz and Liebrecht (*Berliner Klin. Woch.*, 1891, No. 24) recommended it as a substitute for iodoform externally, possessing the antiseptic and siccative action of the bismuth salts and the reducing action of gallic acid. Internally it was used first by Prof. C. Colosanti of the University of Rome, and U. Dutto, Assistant of the Physiological Institute in Rome, who employed it in 100 cases of phthisical

diarrhea, as well as in a number of cases of dysentery and typhoid fever (*La Reforma Medica*, 1891, Nov. 30). Although these investigators reported very favorably on the efficacy of the remedy, the internal employment of bismuth subgallate has not become so extended or general as its virtues would appear to bespeak for it. Perlmutter recently published a paper in the *Münchener Med. Wochenschrift* on its employment in gastric ulcer and diarrhea, his observations being made on an extended series of cases and being inspired by Professor Moritz, who recommended it to his notice. In diarrhea of phthisical subjects and in acute and chronic enteritis, he found it most valuable, all cases of this kind benefiting by its use, and the result being by no means only of a transient character. The bismuth subgallate was given in doses of from 8 to 30 grains, in water, twice daily. It is non-poisonous and produces no by-effects except a tendency toward constipation, which, however, can be readily combated by means of glycerin enemata. The stools will be dark, and care must be taken not to mistake them for those colored by blood. A. Flint (*New York Medical Journal*, 1893, No. 776) used bismuth subgallate in fermentative dyspepsia, in doses of 5 grains after meals.

The writer's results agree perfectly with those of Perlmutter. He has found it an excellent remedy in phthisical diarrhea, and in acute serous diarrhea of an inflammatory nature. In the former cases he administers 15-grain doses three times a day, in cachets, followed by a good swallow of water. In the acute diarrheas the same quantity is given every two hours until its effects become manifest, when the remedy is discontinued. As a rule it does its work in a few hours, and rarely are more than three doses required. In cases of severe pain or tenesmus, the writer gives with the bismuth subgallate 1 or 1½ grain of powdered opium. Bismuth subgallate is undoubtedly a powerful intestinal siccative, in consequence of which it should not be administered, in acute cases, after it has reduced the frequency of the movements and altered their consistence; its action will continue for some hours after the discontinuance of the medication. As a disinfectant in infectious diarrhea it is inferior to many other remedies; but as a simple astringent in phthisical diarrhea and in acute gastro-intestinal disturbances attended with profuse serous discharges, the writer has found bismuth subgallate one of the best remedies at the disposal of the physician.

*Phenol-bismuth* was the next bismuth compound brought forward, or, more properly, bismuth carbolate, of the formula $Bi(OH)_2.C_6H_5O$. It is a whitish or gray, neutral, almost odorless and tasteless, insoluble powder, containing 80 per cent. of bismuth oxid and 20 per cent. of phenol. It was introduced by M. F. A. Jasenski, of Professor Nencki's laboratory at the St. Petersburg Institute for Experimental Medicine, who found (*Archives des Sciences Biologiques*, ii, No. 2), that it is slowly decomposed by the gastric juice into phenol and bismuth oxid; the larger portion, however, which has not sufficient time to be decomposed in the stomach, passes into the intestines, where the conditions are more favorable for its complete decomposition (especially in the presence of the pancreatic juice). In spite of the well-known toxic property of phenol, phenol-bismuth did not have the least injurious effect, although administered for three weeks in daily doses of 75 grai In acute proctitis, enemas of 30 grains in two fl ounces of water, once daily, brought abou a cure two days. In a number of cases of chronic intesti catarrh phenol-bismuth had a beneficial effect. P A. W. Wilcox reports (*Post-Graduate*, May, 18 that in the various forms of chronic gastritis cha terized by pyrosis, pica or boulimia, bismuth carbol is an excellent remedy; and in gastric cancer, wh bismuth subnitrate may mechanically protect ulcerated surface, phenol-bismuth will diminish accompanying fermentation and decomposition.

The writer has obtained good results from bism carbolate in fermentative conditions of the gast intestinal tract accompanied with diarrhea, and chronic gastro-intestinal catarrh; but he does regard the remedy as in any manner superior to older remedies, such as bismuth salicylate, betol benzonaphthol. The dose is 15 grains several ti a day, in cachets, followed by a draught of liquid.

*Bismuth naphtholate* was the next claimant favor, also known as "orphol" and naphthol-bismu This has the formula $2[Bi(C_{10}H_7O)_3]+Bi_2O_3$, and curs as a neutral, brownish, almost odorless and ta nigh tasteless powder when recently made, and co sisting of 80 per cent. of bismuth oxid in chem combination with beta-naphthol. It is insoluble the ordinary solvents, and with age it is prone darken and develop the odor and taste of naphth It is partly decomposed in the stomach; the ma portion, however, passes unchanged into the int tines, where the secretions furnish the conditions ne essary for its complete dissociation. Some of t naphthol is eliminated with the urine, while t greater portion of it is eliminated with the feces, t bismuth oxid being excreted with the stools, as is t case with the other bismuth compounds. The fi clinical reports on bismuth naphtholate are by Sch benke, Blackstein and Petkewitsch, and appeared *Vratch*, 1892, Nos. 41 and 51. They used the reme in cases of ordinary bacillary diarrhea and of ch eraic diarrhea, in daily doses of 15 to 30 grains, wi good results. Then came M. F. A. Jasenski a Professor Von Nencki of St. Petersburg (*Archi des Sciences Biologiques*, ii, No. 2). They emplo the remedy in daily doses of from 45 to 60 grains, i number of cases of chronic intestinal catarrh and diarrhea accompanying cirrhosis of the liver. T results obtained are designated as better than th obtained with the older preparations of bismu Prof. Ferdinand Hueppe of the German University Prague characterizes (*Berliner Klin. Woch.*, 18 No. 7) bismuth naphtholate as a most powerful non-toxic antiseptic. Among other foreign phy cians who have employed bismuth naphtholate w good effect should be mentioned Edmund Chaum of Touraine, Tours, France, who reported his expe ence at the Congress for Internal Medicine, held Bordeaux, August, 1895. The first American phy cian reporting on the use of this new bismuth salt Prof. R. W. Wilcox, who read a paper before the Cli ical Society of the New York Post-Graduate Medi School and Hospital, Dec. 15, 1894. He related t results he had obtained in some one hundred cas He believes that better results have been obtain and in a shorter period of time, than could have be expected with the inorganic bismuth compounds. typhoid fever, he says, there is probably no remedy generally useful as an intestinal antiseptic as bismu

naphtholate, provided it is used in the early stage of the disease; and in phthisical diarrhea a rapid increase of the dose to 60 grains or even 120 grains per day, has given brilliant results. Louis Fischer (*Medical Record*, July 13, 1896) gives decided preference to bismuth naphtholate in summer complaint in children. To a child one year old 5 grains may be given every two, three or four hours, with a little boiled (sterilized) water, and preferably when the stomach is quite free from food. If there is persistent vomiting he gives the remedy per rectum in suppositories, double the dose per mouth being employed for each. Hugo Engel of Philadelphia has used (*New York Medical Journal*, March 30, 1895) bismuth naphtholate in a considerable number of cases of fermentation and bacterial diarrhea arising from the presence of infectious material in the alimentary canal, and considers it a most reliable intestinal disinfectant and astringent in these instances.

The writer has employed bismuth naphtholate in various disorders of the gastro-intestinal tract of bacterial origin. Very good results were obtained in chronic catarrhal gastritis characterized by sour stomach, eructations, pyrosis and regurgitations of acid fluids. Five-grain doses were administered three times a day in capsules or with syrup, and followed by a draught of hot water. Ordinary fermentative diarrheas were also promptly relieved by doses of from 5 to 8 grains every four hours. As already stated, bismuth naphtholate with age assumes a dark-brown color and develops a naphthol odor and taste, referable to partial decomposition; and in this condition it is apt to be rejected by the stomach. A preparation of a pronounced naphthol odor and taste should not be employed.

*Tribromphenol-bismuth*, known chemically also as bismuth tribromphenate or bismuth tribromcarbolate, and styled by the manufacturer "xeroform," was the next introduction in the field of intestinal astringents and antiseptics. It has the formula $(C_6H_2Br_3O)_2Bi-OH+Bi_2O_3$, and it occurs as a yellow or greenish-yellow, nearly odorless, neutral powder, of a faintly sweetish taste, containing 50 per cent. each of tribromphenol and of bismuth oxid. In the stomach it undergoes but little change, while in the intestinal canal it is gradually decomposed into tribromphenol, which possesses great disinfectant power, and bismuth oxid, which unites largely with the ptomains or their toxins, forming with them insoluble substances. A small portion of the tribromphenol is eliminated with the urine, and the bismuth oxid is removed with the feces as sulphide. Tribromphenol-bismuth was first recommended by Prof. F. Hueppe of the German University at Prague as a remedy in Asiatic cholera (*Berliner Klin. Woch.*, 1893, No. 7). He employed doses of 8 grains every two hours, after an initial dose of 15 grains; two to four doses of 8 grains being given at night. Hueppe contends that with this treatment the diarrhea improves by the removal of its cause; that is, the products of the comma bacillus are in some way neutralized by the remedy. If we accept his statements, tribromphenol-bismuth is an excellent and non-toxic disinfectant in cholera. Prof. R. W. Wilcox read a paper on the preparations of bismuth, before the Clinical Society of the New York Post-Graduate Medical School and Hospital on Dec. 15, 1894. The author expressed the opinion that tribromphenol bismuth possesses marked antiseptic power, as well as the soothing effect common to bismuth compounds, and advocated its use in fermentative diarrheas. L. Rynders of the Medical Faculty of Nancy, concludes, from his investigations of xeroform, that this is an excellent gastro-intestinal disinfectant, and calls special attention to its deodorizing power on the stools of the typhoid patients (*Aerztliche Rundschau*, vii, p. 694); and Bouchard confirms this opinion fully (*Wiener Med. Blätter*, 1897, p. 807).

The writer can commend tribromphenol-bismuth as an antizymotic and disinfectant in gastro-intestinal fermentation and in typhoid diarrhea; in the latter cases it exerts a decided deodorizing effect on the stools. Toxic effects from ordinary medicinal doses are not likely to be observed, but the remedy often produces nausea and eructations if administered in wafers, powders, or capsules. It is, therefore, best given in an acacia emulsion. As regards dosage, in simple fermentative conditions, 8 grains every four hours suffice, but where pronounced disinfection of the intestinal tract is indicated, it is advisable to give an initial dose of 15 grains and follow with three or four doses of 8 grains at two-hour intervals, and then to continue this dose, administered every four hours, until the desired effect is produced. From 30 to 45 grains a day are ordinarily sufficient for a thorough asepsis of the intestinal canal in an adult.

*Bismuth phosphate, soluble*, is another bismuth compound of recent introduction. It contains 20 per cent. of bismuth oxid, and is soluble in about three parts water. G. Leiser, O. Doerffler and C. Soehle (*Deutsche Aerzte-Zeitung*, 1896, No. 3) employed this remedy in acute diarrheas, intestinal tuberculosis, and typhoid fever of adults, as well as in choleraic diarrheas of children. In the latter, the following formula was resorted to:

| | | |
|---|---|---|
| Bismuth phos., soluble . . . | gm. 1.5 to 2 | gr. 23 to 30 |
| Distilled water . . . . . | gm. 90 | ℥ 3 |
| Syrup poppies . . . . . | gm. 100 | ℥ 3½ |

Teaspoonful every half-hour or hour.

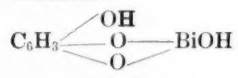
In acute diarrhea of adults the following mixture is prescribed:

| | | |
|---|---|---|
| Bismuth phos., soluble . . . | gm. 3 to 4 | gr. 45 to 60 |
| Distilled water . . . . . | gm. 180 | ℥ 6 |
| Syrup fennel . . . . . | gm. 200 | ℥ 7 |

Hourly, half to one tablespoonful.

No further clinical reports than the preceding are extant.

*Bismuth pyrogallate*—pyrogallol-bismuth or "helcosol"—will be dismissed with a brief description of its physical properties, as it does not appear to have been tested clinically as yet. It has the composition shown by the formula



It occurs as a greenish-brown, amorphous, odorless, tasteless powder; insoluble in water or alcohol, and but sparingly soluble in 0.3 per cent. solution of hydrochloric acid. Vittorio's physiologic experiments (*Pharmaceutische Zietung*, 1894, p. 639) seem to prove that the remedy is non-poisonous, even when ingested in large doses, and that it appears to be indicated specially in infectious intestinal diseases.

*Bismal*—designated chemically as bismuth methylenedigallate — was the next bismuth compound brought forward. It has the formula $4(C_{15}H_{12}O_{10})+3Bi(OH)_3$, and it occurs as a grayish, voluminous powder, soluble in water or acidulated solutions. Clinical reports on bismal are as yet quite sparse. F. von Oefele recommends it (E. Merck's "Bericht,"

1896, p. 123) in very chronic diarrheas where opiates are but little or not at all effective—in such as accompany certain gynecologic and tuberculous affections. He administers from 3 to 8 grains in cachets, three times daily or every three hours, according to the urgency of the case. D. de Buck and P. Vanderlinden (*Belgique Médicale*, 1896, No. 36) also successfully used bismal in tuberculous enteritis. They gave 15 grains from three to four times a day, in oatmeal gruel.

*Eudoxine* was the next claimant to favor. It is the bismuth salt of tetraiodophenolphtalein ("nosophen"). The latter is obtained by the action of iodin on solution of phenolphtalein. It has acid properties, combining with alkalies or oxids of the metals to form salts. Of these, two have thus far been prepared for medical use: the sodium compound, known in the trade as "antinosine," a readily soluble surgical antiseptic, and the bismuth salt, eudoxine, which is the intestinal disinfectant and astringent under consideration here. Eudoxine occurs as a reddish-brown, odorless powder; insoluble in the ordinary solvents and undergoing decomposition into an alkali salt of nosophen and bismuth oxid on contact with alkalies. It contains approximately 53 per cent. of iodin and 14.5 per cent. of bismuth. On internal administration eudoxine passes the stomach unchanged (unless the contents are alkaline), while in the intestines, where the natural faint alkalinity is enormously increased in morbid states, it is decomposed, as above indicated, into bismuth oxid and sodium tetraiodophenolphtaleinate. The latter passes through the intestinal coats by way of the absorbents, and, according to Binz and Zuntz (*Fortschritte der Medicin*, 1896), it is again secreted into the intestinal lumen, and thus exerts a continuous disinfectant action. The first clinical test of eudoxine was made by Ph. Rosenheim, of Prof. Senator's clinic, Berlin (*Berliner Klin. Woch.*, 1895, No. 30). He used it in a few cases of chronic dyspepsia and of summer diarrhea of children, and in 24 cases of enterocolitis in adults. Of these latter, 7 were tuberculous, and in them no result was attained by the eudoxine; 17 were of simple catarrh, of which 5 remained unchanged, 3 improved, and 9 almost entirely recovered. The ordinary dosage was from 5 to 8 grains, from three to five times a day. The next clinical report was by Anton Lieven, and was made at the Fourteenth Congress for Internal Medicine, held at Wiesbaden, April 8–11, 1896; and all the remaining reports discoverable by the writer are American physicians. Prof. R. W. Wilcox of New York (*Medical News*, 1897, July 31) employed eudoxine in 35 cases. Fourteen suffered from chronic intestinal catarrh; of these, six presented coincident hepatic and cardiac lesions. Naturally, the latter class would be benefited by drugs which would influence the liver and heart; but Dr. Wilcox is confident that the benefit was more rapidly obtained than it would have been without the use of the bismuth preparation. Three patients presented intestinal fermentation, with discharges of muco-pus, considerable pain, and foul-smelling stools; these experienced relief, although one required treatment for several months. Four patients suffered from simple intestinal fermentation; these were permanently relieved, although in one instance, nearly five months elapsed before treatment could be suspended. Two women presented exfoliative membranous enteritis; both were put to bed, and received high intestinal irrigations with salol, with a carefully regulat diet and general supervision of all matters which conducive to restoration of health. In addition, drug was used in maximum doses. Both patie passed some months without the passage of shreds membranes. Nine patients presented symptoms both gastric and intestinal catarrh. They all i proved, but not so rapidly as could have been wish until resorcin in 5-grain doses was given before mea The final result was satisfactory. Two patients s fered from acute catarrhal duodenitis, with cutaneo itching, absorption jaundice, tender liver, and cla colored and offensive stools. Both were relieved, far as their intestinal symptoms were concerned, though calomel in small doses (1/10 grain) at hour intervals was given at the same time. Both present well-marked conditions, and obtained relief from t intestinal decomposition with more than usual rapi ity. The drug was not irritant, although Dr. Wilc believes that the effect of the iodin content of t drug upon the glands of the intestines is to rend the stools less consistent. Prof. N. S. Davis, Jr., Chicago, reports (*Medical Standard*, Septembe 1897) having used eudoxine in a large number cases. In many mild cases of chronic enteritis h has been able to almost completely check intestin fermentation with it in a few days, and it seemed t accomplish this more promptly than any other rem edy except naphthol, over which it has the advanta of being agreeable to take and harmless. In mil cases he gives from 3 to 5 grains four times daily; intestinal fermentation is considerable, he admini ters these doses every two or three hours. In gastr tis the remedy has done no perceptible good; but i enteritis, whether associated with inflammation the stomach or not, it has uniformly seemed to be benefit, except when intestinal fermentation was un usually great. The only other reports extant are b E. P. Herscher of Denver, who speaks well of eudox ine in chronic intestinal inflammation (*Western Me ical and Surgical Gazette*, 1898, No. 4), and b Schön-Ladniewski of Lemberg (*Weiner Med. Press* 1897, No. 45).

The writer has found eudoxine serviceable i chronic gastro-enteritis and entero-colitis, where i manifests a mild and continuous disinfectant an astringent action. In acute infectious diarrheas, an in cases of extreme intestinal fermentation, it is no likely to be of benefit, and is here calculated to prov vastly inferior to stronger disinfectants and antizy motics, such as benzonaphthol, for instance. I hav never observed untoward effects from its use. A regards dosage, to adults from 5 to 10 grains may b given; to children from five to ten years of age, fro 1½ to 3 grains; to babes of four months, 3/3 grains to nurslings of two months 1/3 grain, and to thos still younger, 1/6 grain.

*Benzonaphthol*—Napththol benzoate, $C_6H_5COO$. $C_{10}H_7$ was introduced by Yvon and Berlioz (*Semain Médicale*, 1891, p. 91) to supersede betol (naphthol salicylate), over which it was claimed to have th advantage of being less irritating and not as toxic Benzonapthol occurs as a white, odorless, tasteless insoluble powder. Its therapeutic employment de pends chiefly on its content of naphthol. In th intestines it is decomposed into benzoic acid an naphthol, the former being eliminated with the urin as alkaline hippurates, the naphthol as naphthol-sul phuric acid. Prof. C. A. Ewald (*Berliner Kli*

*Woch.*, 1893, No. 35) has found benzonapthol of the greatest service in various dyspeptic disturbances, flatulence and chronic meteorism from intestinal atony, particularly when associated with bismuth subnitrate and resorcin. He gives 8 grains every two hours. However, the remedy is not absolutely infallible; furthermore, in a few exceptional cases of Ewald's, intestinal colic and diarrhea supervened, but promptly disappeared on discontinuing the medication.

M. Bernitt (*Wiener Med. Presse*, 1892, No. 51), Bruck (*Pester Med. Presse*, 1892, No. 46), and Zinnis (*Deutsche Med. Woch.*, 1892, No. 30) recommend benzonaphthol in infectious gastro-intestinal diseases of children and babes, while Kuhn of Giessen (*Deutsche Med. Woch.*, 1893, No. 19) denies it all virtues in these affections.

The writer has found benzonaphthol an efficacious antizymotic in conditions characterized by inordinate fermentation, whether functional or inflammatory in nature. The dose for adults is from 8 to 10 grains every two hours, or about 80 grains a day, administered best in cachets; for children up to one year of age, from 1/2 to 2 grains every few hours; from one to three years, five times daily, 3 grains; from four to seven years, 24 grains per day; from eight to fourteen years, 30 grains daily, with an equal part of sugar or a trace of saccharin. In chronic cases full action sets in only after four or five days; its astringent properties are not very pronounced.

I believe I have alluded to all the antidiarrheal remedies introduced during the last few years. Should any member desire information regarding any other intestinal remedies, the writer of this paper shall deem it a pleasure to supply the desired data so far as lies in his power.

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## THE MEDICINAL TREATMENT OF SOME DIGESTIVE DISEASES.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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There has always been a tendency, both within and without the medical profession, to scoff at drugs. The tremendous development of certain scientific and mechanical departments of the healing art, within the last two decades has, by contrast, placed the homely skill of using medicines in the background. Teachers and students of medicine have alike neglected the old-fashioned details of therapeutics; therapeutic nihilists have arisen who have sought to discredit the value of drugs and, naturally enough, the preconceived notion that ponderable therapeutic agents have little use, has made it possible for those who hold such a view to demonstrate their belief from their own experience. The writer is sufficient of an old fogy to hold that if the regular profession would devote to the physiologic and therapeutic study of drugs the same amount of pains that the homeopaths bestow upon what we believe to be false theories, a great advance would follow, and internal medicine would be correspondingly dignified.

Disease is, in the main, a chemic disturbance, though often of so recondite a nature that we are forced to employ some such non-committal term as "vital" and to abandon all thought of cure through the agency of an ordinary chemic reaction. Even in this latter kind of disturbances, we often find a well-established antagonism between disease and drug, which can not be explained but to which we allude under the term "selective affinity." In general, it may be said that a priori, there is just as much rationality in expecting relief from the action of a chemical circulating in the blood as from the effervescence of a briny bath, or the hanging of a nervous case by the chin and occiput till cured, or the kneading of dermal and subcutaneous tissues, or from reducing a human being to a vegetative state, all of which are methods of therapeutics in good repute and of great value.

Digestive disturbances afford an especially favorable field for the application of drugs, 1, because they are usually more or less chronic and yet not sufficiently urgent to induce the patient to make the sacrifice of time and business interests demanded by hygienic therapeutics; 2, because an exact diagnosis, at least of the immediate physiologic failure, is usually possible, though requiring skill and special methods of examination; 3, because these abnormalities are, to a far greater degree than those of other organs, either chemic or vital in so simple a way as to be amenable to drugs; 4, because surgical treatment is applicable to but few cases and, to these, with a grave prognosis; 5, because really valuable means of local therapeutics have been greatly abused, as to technique and frequency of employment.

For practical purposes the majority of gastric disturbances may be considered functional. The writer's personal opinion is that they are much more frequently dependent on organic change than is usually supposed, but as death seldom occurs, and as post-mortem changes can very rarely be prevented or anticipated, for obvious sentimental if not better reasons, we know very little about the actual state of the gastric mucosa in dyspepsia. Even the microscopic examination of particles of epithelium obtained by siphonage or spontaneous vomiting, is not reliable, since there is normally a shedding of more or less degenerated epithelium. Probably 70 per cent. of gastric diseases, taking them as they occur, are essentially atonic dyspepsias, characterized by deficiency of hydrochloric acid and by sluggish motor action. The immediate relief of the former condition is ideally fulfilled by the administration of the same acid, while without obvious catarrhal involvement, local treatment is not indicated. As to the motor function, probably nine out of ten physicians who were thoroughly impartial, that is to say inexperienced, would declare that the ideal treatment was the intraventral use of faradism. But, considering carefully the various experimental studies as to the action of electricity on the muscle of the stomach, we must conclude that, while it is not absolutely impossible to note a contraction during the time that the battery is in use, there is no evidence that the faradism stimulates the gastric muscle to contract when subjected to this method of treatment. On the other hand, we have a drug, strychnin, which most certainly does stimulate smooth muscle, whether of the stomach or elsewhere in the body, and whether we depend upon physiologic experiments or clinical experience. Such cases—and others—might be thought suitable for the employment of hygiene. But we find that ordinary gymnastic exercises do not produce much improve-

ment; that the fresh air of the country or sea-side is overbalanced by the difficulty of finding proper food in either the typic farmhouse or hotel. Heaven forbid that we should expose such patients to the bacterial and mental infection of a sanitarium or that we should initiate them into the mysteries of invalidism by prescribing massage and rest-cure. They may be cured with great éclat by lavage, but they simply do not need to subject themselves to the discomfort and expense of this method, unless the case is extreme. Neither are they fit subjects for the believer in the elaborate simplicity of dietetics. Some few atrocities of modern cookery may be forbidden but, as a rule, the stomach needs the stimulation of varied and appetizing food, and the more such patients are dieted the more they have to be, the gastric power failing concomitantly with the diminution of the task set before it. Not rarely we find patients who are relieved by hydrochloric acid and strychnin but who do not regain the power to digest without this assistance. Then hygiene, change of air and scene, rest and recreation, come into play, but they must follow, not precede, medication.

In the rather rare cases in which the stomach produces too much acid, avoidance of chlorids, of stimulating food and of irritating circumstances of all kinds, are the prime indications. If treatment, except in a negative sense, is needed, alkalies and secretory depressants are efficient. Rest is undoubtedly the ultimate need of most such patients, though there are a few who are lithemic, and who need some offset to idleness and high living. Very rarely indeed is the rest-cure indicated, there being a great difference between *rest* and *rest-cure*.

As to ferments, the following general statements may be made: 1, there is no information or reasonable supposition that a ferment of the digestive glands is ever produced in excess; 2, the failure of a ferment occurs only in the most serious organic disturbances —though not necessarily locally organic, thus, fever is often attended with failure of ferments. The salivary ferment is particularly resistant to disease, though not of very great importance in health; 3, the administration of ferments should never be resorted to without first demonstrating their absence; 4, after proving that a ferment really is deficient—something that occurs in scarcely 1 per cent. of cases—we must ask whether the stomach and intestine are in a condition to digest on the mere supplying of the ferment, or whether predigestion, rectal nutrition, etc., are not indicated. As a rule, the body which lacks ferments lacks the power of using them if artificially supplied.

Gastric catarrh, ulcer and cancer, for many therapeutic considerations, duplicate the indications of purely functional dyspepsia, if such a thing exists. The lack or excess of acid, the need of a motor tonic, the indication for an antiseptic or anesthetic, must be worked out, case by case, without attempting to rely on a general rule. While a stomach which is badly dilated and diseased so that food actually ferments and putrefies can be cleansed only by repeated lavage, there are efficient internal antiseptics which are all that are needed for the milder cases, and which usually are indicated in addition to lavage, in the severer conditions. All things considered, oil of peppermint is the best of these, but oil of wintergreen may be used if there is a joint indication—no pun is intended —for the employment of a salicylate. For more gradual antiseptic action, when we must consider the bowel as well as the stomach, salacetol is of the highest rank. The writer's experience is not so favorable for the benzo-compounds though these are also antiseptic. Hydrogen peroxid is especially valuable when there is muco-purulent matter present.

Surgery suggests itself mainly in the relief of gastric cancer and ulcer. With the former, the theoretical indication for surgery is balanced by the difficulty of making a diagnosis in time and by the grave prognosis, so far as the operation itself is concerned, so that at present the average case of cancer will continue to receive mainly medical attention. Although the result is inevitably fatal, it must not be forgotten that the duty of the physician is all the more urgent to maintain comfort, and that the ordinary gastric cancer does not occasion the sharp pain that is too frequently connected with malignant disease; hence there is much room for rational treatment in improving digestive deficiencies, in maintaining gastric motility, in keeping the chyme aseptic and even in obtaining healing of malignant ulcerations. Morphin is by no means a drug to be freely used. Gastric ulcer, superficially considered, might be thought to indicate ligation of the bleeding part, but medical and surgical opinion is very nearly unanimous that operation is not feasible. The local use of styptics is plainly contraindicated; first, because it is impossible to get them to the site of hemorrhage in sufficient quantity and sufficient concentration; secondly, because they are all irritants, and tend to cause retching, which aggravates the primary trouble. The real indications are two—absolute quiet obtained by morphin, and vascular constriction by ergot. Both should be given hypodermically. To the best of the writer's knowledge, there is no satisfactory preparation of ergot for such use, all being irritating and some of the so-called ergotins being of unfixed dosage. On the whole, the official fluid extract is about as good as the more expensive preparations. Few physicians realize that many of the unpleasant symptoms and part of the actual danger of gastric ulcer are due to absorption of decomposed blood. Indican is found in the urine in enormous amount and there is great need of intestinal asepsis. Still, for the first twenty-four hours at least the need of quiet is so urgent as to forbid cathartics, enemata, or even intestinal antiseptics. A little ice is usually given, simply to keep the patient from being too restless, but even this is to be avoided as far as possible. After a day or two, salacetol or bismuth subgallate may be given and, after the bowels have been freed from blood, it is well to give bismuth systematically, rather as an astringent dressing than as an antiseptic. The writer's preference is for a 10 per cent. emulsion of bismuth hydrate in water, or pure liquid petrolatum, if the patient shows no distaste for the mineral oil.

In gastric catarrh, with or without dilatation, bismuth subgallate is an excellent and efficient remedy though by no means able to supplant lavage and inflation with menthol or similar sprays. In any condition in which the gastric mucosa is involved, we must make a sharp distinction between the needs of the stomach itself and the needs of the digestive process. Usually, there exists quite a definite opposition between these two indications, the more or less alkaline and astringent application which is generally needed for the gastric wall interfering with digestion while the hydrochloric acid and secretory and motor stimulants required to assist digestion are somewhat

tant to the diseased mucosa. In cases that are solutely or practically functional, we naturally pay ention only to the digestive deficiencies; in severe anic diseases, such as acute catarrh, ulcer and some nifestations of cancer and chronic catarrh, gastric estion must be discontinued entirely for at least a days, the body being nourished by the bowel and n while the stomach is being medicated. A large mber of cases fall between these two extremes and, a number of favorite ready-made tablets and liquid xtures show, many physicians simply stir together various drugs indicated and administer them all once, letting their diverse activities battle for the premacy. In such cases, the rational treatment nsists in doing one thing at a time. Give such ods as may be digested in, say, three hours; in other rds, rather plain but still appetizing and ordinary icles of food. Administer such digestive aids as all insure digestion and emptying of the stomach in out this time. Then, every morning and afternoon, period of two or three hours is at our disposal for dicating the gastric wall, while a drug administered bed-time has a much longer period of possible ion. The writer would confess that his conception a drug acting on the stomach and bowel itself is etty nearly limited to bismuth. The various vege- ble astringents lack the property of a powder dress- g; silver, copper and zinc are too active for more an temporary use, and each, moreover, possesses ecial objectionable features. Cerium oxalate has obvious advantage over bismuth, while, in most the cases in which one or the other must be used, ere is altogether too much oxalic acid formation in e system. The main point in administering bis- uth is to give enough of it. With the possible ception of some of the newer antiseptic compounds, e minimum dose should be half a gram, and twice three times this amount should usually be given. t, within a few days, a cautious druggist has tele- oned the writer in regard to overdose in the case of prescription calling for a gram of the subgallate, ree times a day.

For the long reach of bowel between the accessible rtions of the alimentary canal, the same general nciples of medication apply as to the stomach. It of the greatest importance to be sure that the intes- al disturbance is not the final breaking down of the wer to perform vicariously the duties of the stom- h. Many stomachs habitually shirk digestion, and e owner is unaware of the suspension of function so g as the gastric motor power is sufficient to pass e chyme on to the duodenum. Next, by high ene- ata, we must keep the lower bowel clean and healthy. nally, we must administer the slowly soluble anti- ptics, occasionally ferments inclosed in stomach- oof coatings, and usually the astringent bismuth, eferably now in pure petrolatum. Juggling with thartics and constipating drugs is not therapeutics, hough it may be an inevitable makeshift.

Although in scolecitis, surgery affords the safest d most thorough treatment, there are certainly any mild cases which recover under either consti- ting medication with opium, or laxative treatment th salines or belladonna, with or without intestinal tisepsis and hydrotherapy. If we could be sure at free drainage existed from the mouth of the ppendix and that gangrene and virulent ulceration uld be excluded, medical treatment of even acute ses might be justifiable. But, at present, the only cases in which operation should not be insisted upon, are mild and more or less chronic ones, the patient being so situated that surgical aid may be called almost at a moment's notice. If we carefully consider the history of scolecitis cases, we must conclude that not grape seeds, nor other foreign bodies, not constipation, not necessarily catarrh of the bowel, not taking cold, not even anatomic peculiarities as to meso-, blood-vessels, and lymphoid tissue, are the essential causes. The real cause, in the writer's belief, is unusual virulence of intestinal bacteria, marked by prolonged intestinal indigestion and fermentation. Thus, there is a rational field for the use of antiseptics, drugs to regulate the proper discharge from the bowels, including water, and, in addition, some of the slowly soluble compounds of iodin as resorptives.

In our appreciation of the seriousness of scolecitis and the danger of too long delay of operation, we have gone rather too far in abandoning the old-fashioned conception of typhlitis. There most certainly do exist cases of catarrh and atony, especially of the head of the colon, though not absolutely limited by an arbitrary anatomic division. Here we find the sausage-shaped fecal tumor just as truly as did our predecessors, and, in the absence of leucocystosis, of a septic temperature and pulse, we have as plainly as ever an indication for medical treatment, including salines, antiseptics and, later, such means as will check the tendency to catarrh and prevent an atonic yielding of the bowel.

## THE TREATMENT OF HEART DISEASE BY SALINE BATHS AND RESISTED MOVEMENTS—SCHOTT METHOD.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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The value of a therapeutic agent or method can not be measured by the volume of its literature nor yet by the enthusiasm of its advocates, and no doubt too great a measure of faith in the testimony of false witnesses has bred in us that skepticism which, however admirable as a mental attitude in scientific work, may nevertheless, if too greatly expanded, become a serious stumbling-block in the path of medical progress. We are right in insisting upon something more than dogmatic assertion or the voice of authority in the determination of therapeutic values; we may justly demand the right to withhold judgment, ask for substantial proofs and thoroughly sift our evidence, but behind all this there must be a sincere and earnest desire, not alone to detect error, but also to know the truth, and the ultimate test must after all be derived from personal experience and the repetition of such experiences.

If a new procedure is rational, if the evidence in its favor seems fairly good, and if it promises more than the old, we are in duty bound to give our patients the benefit of the trial. The world has not moved very greatly in this direction in the last 200 years. We may now read with astonishment the vituperative paragraphs which proved with a most imposing show of logic and a vast amount of physiologic and anatomic

data that Harvey's great theory was the acme of absurdity; but we must also admit with some shame that nearly fifty years of this nineteenth century were required for the establishment of typhoid fever as a distinct clinical and pathologic entity. Upon the other hand, we wonder at our simplicity in accepting scores of therapeutic novelties, only to find them worthless and not always harmless. Curiously enough, too, that old stumbling-block—the blind worship of great names—has in the last two decades been stimulated by bacteriologic and pathologic discovery only to be discredited later by some unsatisfactory and hazardous therapeutic methods derived from the same sources. We have learned, for a little time at least, that even the greatest investigators must be allowed a little leeway when they enter the field of clinical diagnosis and therapeutics, and that important and valuable discoveries may lack the endorsement of a great name. During the past forty years there have come from time to time communications from certain medical men in the little town of Nauheim, Germany, and these claimed that remarkable results might be obtained in chronic heart disease by the proper use of gymnastics and baths. Beneke, Groedel, and August and Theodor Schott in admirable articles, stated again and again the facts as we know them now. Their treatment was rational, their results extraordinary, yet only a casual notice was granted them and their work. Suddenly, after four decades of neglect, a few men in this country and in England began to write of the treatment and publish their own experience; then followed a flood of literature and Nauheim, formerly an unimportant station, was visited by one hundred thousand patients in a single year It will be seen then that the so-called Schott method is not new, but that after forty years of sheer neglect it has received a partial recognition and been placed upon trial by our profession.

The greater part of its literature, strange to say, is to be found in British journals, the most conservative in the world. It is for the most part very recent. As late as 1894, when the writer first used the treatment, there was but little in the English language—or indeed in any language—and curiously enough, American physicians, the most progressive in the world, have been almost as little concerned with it as the French, whose indifference has at least the excuse of racial antipathy. Heineman, Babcock, Camac and the writer have been the only American clinicians who have reported upon it. In England the flood of medical controversy was initiated by Bezley Thorne's enthusiastic advocacy of the treatment, and as a result the method was brought prominently before the most conservative element of our profession. The result has been remarkable. The favorable reports of several of the most eminent English clinicians, who visited Nauheim and personally investigated the effect of the baths and movements; the fact that the special commission of the *Lancet* also endorsed the treatment, and the confirmatory case reports from many sources combined to place it before the profession of the British Isles in a very favorable light. Such criticism as has developed has been, with one or two exceptions, of the honest and helpful variety, which seeks to correct hasty conclusions, modify extravagant statements and establish a correct theory as a basis for therapeutic application. For here, as elsewhere, there are extremists; and men who will tell us to a millimeter the shrinkage of a dilated heart after a bath, and who court disaster by an undiscriminating advocacy of a powerful agent, are opp by men who deny the evidence of their own sens and still more emphatically that of other men's se —and condemn the treatment without a fair t There is a middle ground. Four years' experie with the Schott method in public and private p tice has convinced the writer that it is a method w is well-nigh indispensable to the efficient treatm of chronic heart disease, provided always that it applied intelligently and only in appropriate instan Indiscriminate use of so potent a remedy means tain disappointment and positive injury in many ca

The Schott method ought rather to be called Method of Treating Chronic Heart Disease by B and Resisted Movements, the brothers August Theodore Schott having been instrumental in secur the wider acceptance of the therapeutic method, in combining the baths and Swedish movements make a rational system, but having no genuine cl to original discovery. To Beneke, who wrote firs 1859, and to Saetherburg, the originator of the resis movements, must be granted a large portion of credit, hence no one man's name should be given the method.

### DESCRIPTION OF METHOD.

What is the so-called Schott Method? It may stated briefly as consisting of the systematic us saline baths of definite strength and temperature, the coincident or alternative employment of a cert series of resisted movements. The treatment orig ated in Nauheim, Germany, where the natural spri are strongly saline and heavily charged with carbo acid gas, their varying temperature and strength m ing them admirably adapted to therapeutic use. T chief of a multitude of chemical constituents of th baths are sodium chlorid (1 to 3 per cent.), calci chlorid (.1 to .3 per cent.), with a considerable quant of iron and a large amount of free carbonic acid g Their temperature varies from 81.7 to 95.5 degrees In practice the higher temperature and weaker wat are first used, the water being freed from the carbo acid gas; a lower temperature, effervescent bath greater strength in saline constituents being gradu attained as the treatment progresses. Baths are gi daily, rarely more than three being taken conse tively, that of the third or fourth day being omitt While the natural baths are better adapted to tre ment, perfectly satisfactory results may be obtai from artificial baths made after the following formu

*Formulæ.*—To 40 gallons of water (usual amou required) add sea salt, 3 to 10 pints (approxim strength 1 to 3 per cent.); calcium chlorid, pure, to 15 ounces. It is important to note that this la ingredient is not the commercial chlorid of lime, whi by giving off chlorin, would become a source of d comfort and danger. To introduce or generate c bonic acid gas we may use a soda siphon with c ducting tube or the following formulæ of Bez Thorne:

Mild—$NaHCO_3$, $\frac{1}{2}$ pound; HCl (25 per cent.) $\frac{3}{4}$ pound.
Medium—$NaHCO_3$ 1 pound; HCl (25 per cent.) $1\frac{1}{2}$ pounds.
Strong—$NaHCO_3$, 2 pounds; HCl (25 per cent.) 3 pounds.

The salts are first dissolved, the hydrochloric acid then added and thoroughly distributed. The wri has found the best agent for adding the acid to be douche bottle and tube, the acid being thus eve distributed throughout the mixture.

*Immersion.*—The patient remains immersed fr five to twenty minutes, the first bath being brief

period gradually lengthened. If the patient be y ill he should be carried to and from the bath d spared any exertion. While in the bath he should ain absolutely quiet, breathe regularly and refrain n from speaking. Upon leaving the bath he may rolled in warm blankets to rest for at least one hour.

*Temperature.*—The temperature is at first about 93 grees F., and may be considerably reduced after the or eight baths have been taken and the use of carnated baths begun, provided such reduction is conered necessary. Usually, the patient's sensation is afe guide to the regulation of temperature. The th should feel pleasantly and quite definitely warm roughout the period of immersion, and the patient ould be cautioned and told to report at once any ndency to chill.

The movements are very simple Swedish movent, and as recommended by Schott, comprise nineen exercises, so planned as to bring into action every uscle group in the body. These are best illustrated plates, such as I now place in your hands.[1] The ovements are intended to produce without fatigue e beneficial result of exercises, and are of decided lue in the treatment of almost all cases to which e baths are applicable.

Before considering the effect of these baths and ovements let us inquire what are the conditions hich must be fulfilled by the ideal remedy for chronic art disease. They are the following: *a*, the heart ust be rested and strengthened and its own cell-etabolism and circulation be improved; *b*, the ripheral resistance must be lessened; *c*, the general nous engorgement and failure in metabolism must overcome. That these indications are fairly met this treatment in the larger number of heart lesions positively proven by a study of the effect of baths movements upon our patients as noted below:

*Effect of baths.*—1, There is a fleeting sense of ppression and dyspnea (rarely seen by the writer); a feeling of exhilaration and well-being; 3, slowing the pulse, and coincidently, a fuller and stronger eat; 4, brightening of skin, nails and mucous membrane, indicating relief of cyanosis, freer capillary rculation; 5, secondary reduction of pulse tension ith maintenance of lower rate; 6, marked reduction cardiac area, most marked primarily in right heart, t involving both lateral and vertical dimensions. he effect of the movements is almost precisely simir, but as long maintained.

The elaborate theory of Schott, which assumes the nbibition of saline and gaseous constituents and eflex stimulation through the skin, must, I think, be garded as unnecessarily elaborate and very unsatisctory. It is not necessary to make a theory to fit ny particular sort of a bath, for a simple and adeuate explanation would seem to be found in the ell-known effects of warm baths in general upon the irculation. The chief effect of such baths is to free he circulation in the peripheral vessels, thus reducing its work of the heart and enabling it to receive and ass on more blood with less effort. Rest and warmth fter the baths prolong this effect for a considerable eriod. Thus, venous engorgement is relieved, norial cell-metabolism re-established, and the products f suboxidation are either consumed or swept away nto their proper eliminative channels. The stronger the bath and the more $CO_2$ it contains, the more stimulating it will be and the less likely to be attended with chill during or after the bath, and the more marked and sudden its effects. The flowing baths at Nauheim are almost precisely like surf baths in their effects, and are never used until late in the treatment. In the movements much the same effects are produced as by the baths, through the opening of the immense drainage area embraced in the capillaries of the muscles. To understand this we only need to remember that rapid or protracted contraction of a muscle hinders circulation and induces vasomotor constriction, while gradual contraction produces dilatation of the capillaries and mechanically assists the onward flow, thus favoring greatly the general circulation. The initial rise in blood-pressure noted in using the baths is, in the case of the movements, almost entirely lacking.

Having thus briefly discussed the general methods without any attempt to cover minor details, you will perhaps permit a few deductions from a personal experience with this treatment extending over a period of four years, and embracing nearly one hundred cases. Let us consider, 1, the necessity of scrupulous adherence to the exact formulæ representing the constituents of the Nauheim baths; 2, the relative value of the baths and movements; 3, the cases best adapted to treatment; 4, the cases in which the treatment has proven less useful, though harmless; 5, cases in which it is contraindicated; 6, the precautions necessary if the best results are to be obtained; 7, the actual results obtained in suitable cases.

*Is strict adherence to formulæ essential?*—In the writer's opinion strict adherence is not essential, though the general make-up of the baths should be about the same. The important features are warmth and moisture, and excellent results are obtained without the use of any ingredient save the salt, which prevents chilling and acts as a cutaneous stimulant. Carbonic acid acts in much the same way, but, while delightfully stimulating, is not absolutely necessary, unless the colder baths are used. It is doubtful whether these cool baths may be safely used elsewhere than at the natural springs, and they are moreover entirely unnecessary in most cases. It must be remembered that immersion in plain warm water will slow the pulse in precisely the same way as the regulation bath, but such baths are not advisable, because the feeling of exhilaration and well-being is not marked, the effect upon the heart is less decided and less enduring, and the liability to chill is increased.

*Relative value of baths and movements.*—The effect of baths is more permanent than is that of the movements, but both should be used, the movements in the morning and the baths at night.

*Cases best adapted to treatment.*—It is admirably adapted to cases of incompensation of moderate severity where rest is not to be had, and to those severer cases in which rest and cardiac stimulants have proven useless or reached the limit of effect. The particular class of cases best adapted to treatment are the mitral cases, particularly those of regurgitation, even if very advanced, and all cases of slight incompensation, in which marked arteriosclerosis and myocarditis are not present. In exophthalmic goiter, cases of functional irregularity, of neurasthemia, in all cases of anemia and in chronic rheumatism it is very useful.

*Cases in which it has proven of little use.*—In the writer's hands aortic cases, whether stenosis or regurgitation, have not as a whole yielded good results.

[1] Author: Extreme Dilatation of the Heart due to Valvular Disease with Special Reference to Treatment by Schott Method. International Clinics, Vol. ii, 2d Series.

No harm has been done, and many have improved, but the writer is not satisfied that the treatment is here of any decided value, and believes that simple rest and the resisted movements are much to be preferred.

*Cases in which it is contraindicated.*—These are aneurysm, marked arteriosclerosis, chronic myocarditis and chronic Bright's disease, yet, while baths are in these cases distinctly dangerous and harmful, the movements may be decidedly beneficial.

*Precautions.*—To obtain the best results, the tub should be large and the patient immersed to the chin if possible. The baths should never be given hot, nor, on the other hand, should the patient feel any chill during the bath. Great pains must be taken to avoid voluntary movements during and after the bath. If the circulation in the extremities be poor, brisk, light friction may be used. If calcium chlorid be used it must be pure. A very sick patient must invariably be watched by a skilled attendant throughout the bath. If $CO_2$ is actively generated it is well to fan it away before placing the patient in the bath. Cases of extreme incompensation are best treated at the outset by rest in bed, and the usual remedies; they will almost always show marked improvement, and when this improvement begins to flag one may begin the baths and use the exercise with slight daily increase in the resistance. Allow an exceedingly gradual resumption of voluntary movement and accept no case of severe incompensation for less than six weeks of treatment.

The following rules must be observed in using the movements: Remember that they are intended to produce the beneficial result of exercise without fatigue, and you have the keynote of success, and can appreciate the scrupulous care necessary in using them in chronic heart cases. The nicest judgment and most painstaking skill are required, and increase of the pulse-rate, pallor, or evidence of dyspnea warns us to stop at once. The amount of resistance, rest intervals, and number of movements well borne by the patient must be left to the operator's good sense. Furthermore, the clothing must be loose; each movement should be performed deliberately and smoothly; the breathing must be deliberate and regular; the resistance should be varied according to the strength of the patient and the effect produced; and no movement should be repeated in the same limb or muscle group. Thus simple and rational are the principles of this treatment.

*Results obtained.*—If proper care in the selection of cases and strict supervision be exercised, the results are really remarkable. The writer has never seen such extraordinary shrinkage during the first bath as has been described by some writers (3 inches), but in an old mitral case a man must be strongly biased or a trifle weak in his physical diagnosis if he can not easily demonstrate a decided recession of the borders during the bath. That this is not due simply to the somewhat deeper breathing induced by the bath, as has been asserted, may be easily demonstrated by testing the effect of similar breathing before the bath. It must be remembered, however, that rest alone may produce remarkable shrinkage in a dilated heart, and it is probably wise to try rest, digitalis and strychnin for the first week or two and thus get a very gradual rather than rapid change in the conditions. As before stated, we always arrive at a point where progress is slow, and then the baths are indicated. While the writer believes that the effect of the baths is oft overestimated, by reason of the fact that the effect simple rest is underestimated, yet the shrinkage the cardiac area, the improvement of the heart acti the pronounced diuresis, and the prompt removal secondary symptoms under this rational and simp treatment are decidedly impressive and, in the writer opinion, no treatment of dilated heart can leave t salt baths and movements out of that great therape tic combination which includes digitalis and stryc nin, baths and resisted movements, walking on t flat and hill-climbing. The rational therapeutist c omit none of these from his list, yet he might find hard to fix their relative importance. If the writ were forced to discard all means but one, baths a resisted movements would be his choice as being the broadest application. But fortunately we are n thus limited, and the measure under discussion for in any event one of the most important adjuncts the successful treatment of heart disease.

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## NOTES ON TYPHOID FEVER.

### TWO HUNDRED AND TWENTY-FIVE CASES TREATE DURING AN EPIDEMIC OF THAT DISEASE.

Presented to the Section on Materia Medica, Pharmacy and Therapeut at the Forty-ninth Annual Meeting of the American Medical Association held at Denver, Colo., June 7-10, 1898.

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Typhoid fever remains a most interesting study Its pathology, which was supposed to have been set tled years ago by the discovery of the bacillus o Eberth, will have to be remodeled to fit certain fact of recent research. The bacteriologist, who has don so much to illuminate this disease, can not yet cal his labors finished. The best efforts of the therapis to evolve a treatment which will abort, or even materi ally modify, the course of the disease have signall failed. The clinician must often confess his short comings in its diagnosis.

An epidemic of this disease began in the city o Minneapolis in February, 1897, and was traceabl directly to the water-supply. Drs. Westbrook and Wilson,[1] of the laboratory of the State Board of Health isolated the bacillus typhosus from the water in April of that year. Nearly every case seen during the months of March, April and May was typic and severe. The spring floods, which came about the middle of May, were unusually severe and the river from which the water-supply is taken, remained comparatively high during the remainder of the summer and fall. Then followed a series of most interesting cases, more than half of which were atypic. The total number of cases seen by the writer from March 1, 1897, to May 1, 1898, was 225. Of this number 114 were typic and could have been easily diagnosticated clinically. The remaining 111 were atypic, and many of them could not have been identified without the aid of certain laboratory tests. For convenience these 111 cases are divided into three classes, as follows: 1, the extremely mild, 55 cases; 2, abortive, 28 cases; 3, beginning concurrently with some other disease, 28 cases.

The first class of cases is well illustrated by the following history:

*Class 1.*—C. B., male, aged 32, had been feeling ill three days, headache, anorexia, lumbar pains, general muscular soreness, temperature 99 degrees F. at 3 P.M.; tongue slightly furred

h white coating; slight tenderness on deep pressure over ht iliac region; diazo-reaction and serum test both negative. Fourth day. Temperature, 9 A.M., 97.6; 3 P.M, 99 degrees; her symptoms about the same; urine and blood tests both gative.

Fifth day. Temperature, 9 A.M., 97.8, and 5 P.M., 99 degrees; adache and muscular pains increased; tongue more deeply ted; bowels constipated; urine shows faint rose color h diazo reaction; serum test negative.

Sixth day. Temperature, 9 A.M., 99, 4 P.M., 99.8 degrees. stinct rose-colored diazo-reaction; serum test negative. Faint grouping was noted with the serum test on the eighth , and a perfect reaction on the tenth, twelfth, fourteenth d twentieth days. Slight enlargement of the spleen was ted on the tenth day. The temperature vacillated between 6 and 99 degrees from the eighth to the eleventh days, after ich it remained normal. The tongue cleared off, appetite turned and the patient felt as well as usual.

This class, of which the above is a good representa-ve, presents many variations in the symptoms. But, a rule, the usual prodromata are present, with a ry low fever of ten days' to two weeks' duration. ll have reacted to the diagnostic tests for typhoid ver.

*Class 2.*—Alice W., female, aged 13 years. Had eaten in-dinately of sweetmeats three days ago; has been vomiting er since; intense headache, epigastric pain and tenderness. mperature 103, pulse 90; respiration 20; diazo-reaction and rum test absent.

Fourth day: Temperature, 3 P.M. 104, respiration 20; pulse ; vomiting ceased; tenderness over entire abdomen; diazo-action intense; serum test negative.

Fifth day: Temperature 9 A.M. 102, 4 P.M. 103; headache t so severe; feels much more comfortable; no pain in epi-stric region, but still tenderness on pressure over abdomen; ea of splenic dullness considerably increased; no spots; serum action present.

Seventh day: Temperature 9 A.M. 97.5; 4 P.M. 99. She feels ll and wants to sit up. The temperature registered between .5 and 99 for three or four days, the tongue cleaned off, ap-tite returned and she felt as well as usual. The serum reac-on was present on the 6th, 8th, 9th, 12th and 20th days.

This is a fair representative of this class of cases. he outset is generally rapid, sometimes sudden with hill or, if the patient be a child, convulsion. The mperature rises to 104 or 105, or even higher, for ree or four days, then suddenly the disease termin-es by crisis similar to that of pneumonia. There is nerally no cough in these cases, and in none of hem could there be detected the slightest physical gn of lung involvement. None of them have shown he rose-colored spots. In some, splenic enlargement uld be plainly detected. There was sometimes nderness in the epigastric, or in the right iliac gion, but often these signs were wanting. All of hem reacted to the urine and blood tests, and as a ule each test appeared early in the disease, the diazo-eaction almost invariably appearing first.

*Class 3.*—Pneumonia, 7 cases, severe acute bronchitis 10, mygdalitis 3, otititis media 1, pleuritis 2, peritonitis 1, renal ematuria 2, cystitis 1, periostitis 1.

I would call attention to this as a very interesting lass of cases. In 23 of them there is a suspicion that he respiratory tract was the point of invasion of the nfection. Sicard [1] believes that one-tenth of all cases re infected in this manner. Henrots' [2] report of 112 ases of typhoid fever among a troop of 1600 soldiers, ho during a sham battle passed over a very dry and usty field which had been fertilized with human ex-rement, would indicate the respiratory tract as a oint of invasion of the bacillus typhosus, especially s it was noted that a great number of them had pneu-onia and other pulmonary complications. Flexner's [3] ase, in which the typhoid bacillus was found in the ung, liver and spleen, while the intestinal mucous membrane was normal, and the mesenteric glands not enlarged, would seem to add additional weight to this theory. There is abundant evidence in the recent literature of this disease to show that the intestinal lesions are not a necessary part of its pathology. Nichols and Keenan [4] have recently reported a case and collected nine others in which no lesion of the intestine was found, although the typhoid bacillus was cultivated, usually from the spleen. Sanarelli [5] maintains that the disease is, properly speaking, not an intestinal one; that the spleen and lymphatic system are the points where the bacilli produce their peculiar toxins, and the intestinal lesions are due to secondary causes. Osler [6] makes the clinical observation that "the severity of the symptoms of typhoid fever bears no relation to the extent or intensity of the intestinal lesions."

There have been two deaths; a little less than 1 per cent. This is not mentioned to bolster up any particular treatment, but rather, to show the fallacy of mere figures, unconnected with other facts, when used to prove the efficacy of any so-called abortive treatment. One-third of these cases have either aborted before the tenth day or run a course so mild as to make the diagnosis of scientific interest without the use of the particular remedies which are claimed to produce these results. While not decrying medicinal treatment in this disease, the writer believes that other factors play a much greater part in affecting the mortality. The attenuation of the specific infection, the amount received, the individual resistance or degree of immunity, may be mentioned among these factors; and the peculiar circumstance of this epidemic would tend to show that at least one of them had much to do with lessening its severity.

It is desirable to call attention to the value of the chemic and bacteriologic tests in the diagnosis of this disease. In a former article [7] the writer has shown the relative values of these two tests. The diazo-reaction appeared first or at the same time in 80 per cent. of the cases in which it was used side by side with the serum test. It has failed to appear in 12 out of 200 cases, and in only one of these was it fairly tried. It almost always appeared before the eighth day, even in the mildest cases; but in some of these it is present only on one or two days. To be certain that it has not appeared, tests should be made daily. Although it is found in some other diseases—measles, scarlatina, parotiditis, varicella, tuberculosis and cancer—by careful attention to the clinical symptoms, this test is a valuable aid in making an early diagnosis in typhoid fever. Simon's [8] method, with Green's [9] modification of the formula, has been used and no test accepted unless a pink or rose color was given in dilution with five to ten parts of water.

The serum test is the anchor in the diagnosis of this disease, and is very nearly, if not quite, pathognomonic. Dr. Wilson, [10] assistant bacteriologist to the Minnesota State Board of Health, has made 1450 tests from 365 of my patients. Wyatt Johnston's dried blood method with dilution of about 1–25 was used in about one-half the tests, and Dr. Wilson's [10] method of collecting the blood on aluminum foil, weighing and diluting it accurately to 1–25, was used in the latter half. Of those cases in which the reaction was negative throughout, one was typic typhoid fever clinically. Two others were twin infants ten weeks old whose temperature ranged from 100 to 103 for three weeks. Each had rash which was not typic.

They had diarrhea, distension of the bowels and enlarged spleen. The urine of each gave diazo-reaction throughout the illness. They had been partly bottle-fed, the family using infected water. No other members of the family had typhoid fever. One other case of doubtful diagnosis was reported by the writer[11] in a former article. These four would make a percentage of about 1.8 in which the reaction was absent. On the other side there were two cases, one of which has been reported,[12] in which the reaction was present during the course of another disease, in which there was at least a suspicion that typhoid fever was not present. The second case was one of severe erysipelas, during the course of which the serum reaction appeared on the fifteenth day. The spleen was enlarged, and there was diarrhea with characteristic stools. There was at the same time another case of typhoid fever in the family.

Gwyn's[13] case of typic clinical typhoid fever with rose spots, diazo-reaction, hemorrhage from the bowels, serum reaction negative, in which cultures from the blood showed only Gaertner's bacillus, may throw some light on such reports as Brill's,[14] who, in seventeen cases clinically resembling typhoid fever found the serum test negative. And further research along this line may prove Widal's test pathognomonic of infection with the bacillus typhosus.

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11 New York Medical Journal, April 16, 1898.
12 Loc. cit.
13 Gwyn: Johns Hopkins Hospital Bulletin, March, 1898.
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## CLIMATIC VERSUS SERUM TREATMENT OF PULMONARY TUBERCULOSIS.

Presented to the Section on Materia Medica, Pharmacy and Therapeupeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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DENVER, COL.

The climatic treatment of disease is a most important subject, and one that I am convinced has not been fully studied and appreciated. No doubt many failures are to be attributed to the fact that neither proper cases nor proper climate have been selected. Because a patient has tuberculosis is no reason or excuse why he should be sent two thousand miles or more from home and comfort and friends, only to find, perhaps, his malady increased, and to die among strangers. We should prescribe a change of climate with as much discretion and judgment as any other remedy. Whether a patient should be sent from come in search of health will depend upon several conditions. The stage of the disease, the vigor, vitality, disposition of the patient, and the means with which to live comfortably, are all to be considered. Physicians in the Rocky Mountain region are continually meeting with cases that should never have been sent to this country. Too frequently we are obliged to advise their immediate return. Tuberculosis in the last stages is only aggravated, and the condition of the patient made worse and more uncomfortable by a residence in this altitude.

Climatic treatment, like any other treatment of disease, should be applied early. The earlier the application of the remedy, the more certain and positive the results. It may be said, with little fear of contradiction, that tuberculosis in the first stage, and often in the second, is cured by a proper change of climate. In selecting cases for climatic treatment, therefore, by all means select the early ones. Do not wait until the golden opportunity is lost in the hope of arresting the disease by less effective measures.

It must be stated in this connection, however, and it must be admitted, that tuberculosis originating in this climate, as a rule, runs a rapid and unfavorable course. This has been the observation of those who have had the opportunity of watching these cases. It has been my misfortune to have met with a few such patients, and they have formed no exception to the rule.

There is another factor of no little importance that should be considered in the selection of cases appropriate for climatic treatment, and that is, the financial circumstances of life. Many seem to entertain the impression that no matter what the stage of the disease, if they can only live to reach this land of promise, their ills will take wings; they will find ready employment and health will soon be restored. By the irony of fate, many find no employment, and, as a result of anxiety and forced economy, the ills are increased. If a patient's circumstances are such that he can not live in comfort and idleness, if necessary, for at least a year, it would seem hopeless to send him in search of health. Something more is needed than mere climate. A contented mind, freedom from worry and anxiety, good and abundant food and cheerful surroundings—these are all essential factors. I contend that it is more humane to allow a patient to die in peace at home, even if his days are shorter, than to send him in the later stages away in search of health, unless he has means with which to command every comfort.

The selection of the proper climate is quite as important as the proper selection of cases. There is no climate suitable to all cases, although in general terms we may say that the essential features are altitude, dryness, abundant sunshine, and uniformity of temperature. Wherever these conditions prevail, a tubercular patient has the best chance to recover. Early cases, with no heart lesions do best, as a rule, in a high altitude with its invigorating and stimulating atmosphere. These are the cases that do remarkably well in Colorado. More advanced cases need a warmer and a less elevated climate. Such cases do better in New Mexico, Southwestern Texas, Arizona, or the interior of Southern California. Many cases do well in Colorado during the summer and fall, but do not bear well the cold of winter, and it becomes necessary for them to go southward during this season; and, again, there are many who do wonderfully well in winter in New Mexico, Texas or Arizona, but who can not endure the heat of summer in those regions. It becomes necessary, therefore, to shift a patient about from one climate to another in order to take advantage of the best seasons until he has recovered.

Another important consideration is the fact that tubercular patients recover slowly. It requires from six months to three or four years, according to the condition of the patient and the stage of the disease, to entirely recover, and even after this period it is

sually necessary for a patient to live in that climate here he has recovered, or a similar one. Too frequently patients come to this country with the idea hat within a very few months their disease will be radicated in some magical way, and that they can hen return with safety to their eastern homes. This s a most erroneous impression, and should not be encouraged. The earlier the cases are recognized and ent to appropriate climates, the more likely that they ill be able to return to their eastern homes, providng every vestige of the disease has been eradicated. uch patients must, however, be prepared to flee for heir lives on the slightest return of their malady. s a rule, we can not trust them, and they will reain long after they have been warned, and often ntil it is too late to regain the lost ground. The uccess of climatic treatment will, therefore, not only epend upon the proper selection of climate, but pon the proper selection of cases as well.

At the present time the serum treatment of tuberulosis is attracting widespread attention. The almost specific action of antitoxin in the treatment of iphtheria has inspired many of our best and brightst men to seek a like remedy for the cure of that rch enemy of the human race—consumption. At he present date it is generally admitted that the erum treatment of chronic tuberculosis is disappointng. It remains yet to be proven whether it is effecive in the early stages. If it produces immunity, if t arrests the progress of the disease in incipient ases, it still remains to be proven how long the imunity continues.

If antitoxin is nature's remedy for overcoming isease, it would seem that in a disease which is esentially chronic, with no tendency to self-limitation, f immunity is conferred it would be necessary to upply the system continuously and indefinitely in rder to preserve the immunity and to prevent reapse. A patient with tuberculosis in its early stages may be cured by the administration of antitoxins. Will he remain cured and how long are equally important considerations. In diphtheria it has been roven that the immunity produced by antitoxin in ull protective doses lasts at most only three weeks. s it reasonable to suppose that an antitoxin for tuberulosis would produce immunity for a longer period? f a patient's environment is not altered, if the same onditions and surroundings exist after as before reatment, or if the patient again inhales the fatal acillus, will there not be a return of the disease?

It has been proven beyond all doubt that proper limatic treatment almost invariably arrests early uberculosis. I will not occupy the time of this ociety by reporting cases to prove this assertion. That even many late cases improve and remain in a air degree or health for years, and that many second tage and most (at least 90 per cent.) of the first tage cases, entirely recover, is a fact so well estabished that it is unnecessary for me, on this occasion, o enter upon a detailed history of cases. It is true, however, that with very few exceptions a patient can not return to a low altitude and previous environment without great danger of the redevelopment of the disease. The immunity conferred by climate is thus lost. Why should this be so? We recognize that altitude, pure air, sunshine and uniformity of climate are essential factors in promoting the cure of tuberculosis. Why? May it not be because these conditions invigorate the system and stimulate the production of the normal antitoxins of the body? May this not be the reason why immunity is lost sooner or later when a patient cured by climatic treatment, returns to former conditions and surroundings? If climatic treatment must be ontinuous in order to preserve immunity, is it not equally true that the artificial introduction of antitoxins into the system must also be continuous in order to maintain immunity? The brilliant work that has been done the past few years in the bacteriologic laboratories of the world presages victory in the discovery of a remedy for tuberculosis. There are, however, unseen forces that must yet be understood and overcome. The mysteries and difficulties of artificial antitoxin production and application are distracting and apparently unfathomable, but it ill becomes any man to say that these difficulties and mysteries will not be solved.

Until we have more light to guide us, until we are more fully convinced of the utility of the serum treatment of tuberculosis, we should continue to take advantage of climatic treatment, which has been fully tried and seldom found wanting.

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## A FEW CONSIDERATIONS REGARDING CLIMATIC CHANGE AND SERUM THERAPY IN PULMONARY TUBERCULOSIS.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

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If an apology is necessary for the introduction of that concerning which so much has already been written, it is found in the vast importance of the subject, the wide diversity of opinions, the rather general absence of clearly defined knowledge and the increasing mass of literature extolling without limit the virtues of special methods of treatment. It is not my purpose to advocate unduly the adaptability of any climate or climates to the various stages of the disease. To present a plea for the more rational and conservative measures of treatment in a climate appropriate to the individual case, in opposition to the present employment of serum-therapy in its various modifications, is the object of this paper. As a preliminary postulate, I will submit that climate in conjunction with painstaking attention to details of management offers to the pulmonary invalid greater assurance of improvement than can be otherwise obtained.

Waiving for the present the acceptance of this proposition, it is perhaps well to allude briefly to the errors of judgment often observed in the early history of pulmonary tuberculosis prior to arrival in Colorado. I do not refer merely to mistaken or deferred diagnosis with its unfortunate results, but more especially to the ill-considered advice imparted, when the nature of the condition has at last become clearly established. The temporizing delay at this stage of the disease, more important than any other, forms too frequently a portion of the evidence which may convict the medical adviser of culpable and contributory negligence. I have been impressed, repeatedly and forcibly, from a study of my records, that the vast majority of the pulmonary invalids in Colorado arrive

only after moderately active and extensive infection has taken place. It is by no means infrequent in my experience to feel compelled to advise an immediate return for the unfortunate who has but finished his journey of one or two thousand miles only to find that he has come too late. The history of such cases usually discloses the duration of a several years' illness, with ample opportunity for earlier climatic change had it been advised or properly insisted upon. It is pertinent to state that out of a total of 350 selected cases which have remained under my supervision, more than half presented themselves with extensive pulmonary involvement averaging about a year and a half subsequent to the recognition of their condition. The fact that 213 of the cases in the entire list came to Colorado with pronounced signs in each lung should emphasize, not only the necessity of earlier diagnosis, but the wisdom as well of more prompt climatic treatment.

The patient with pronounced physical signs of pulmonary tuberculosis often states upon arrival that he was advised by his physician to remain at home during the summer and early fall and prepare to visit this climate for a few months in order to escape a bad winter. The history almost invariably shows a progressive decline in weight, strength and appetite, with increase of fever, cough and expectoration during the so-called favorable season at home. He consequently arrives in Colorado less prepared to respond to the influences of her climate, and is deprived, for the year at least, of a considerable portion of her most favorable and delightful season. Others, after one or two years' illness at home, are frequently instructed to come to this State for a definite period, of perhaps three to six months, regardless of climatic results. As a matter of fact, many such cases do not live out their expectancy in Colorado.

It is interesting, but discouraging, to note the large proportion of cases coming here as a last resort. A reference to my records show that a very considerable number of cases first sought climatic change elsewhere. When it is considered that the distinctive climatic conditions in Colorado are especially applicable to the early cases and contraindicated for those with the most extensive infection, the true significance of such procrastination will be more fully appreciated. This would be less worthy of comment were it true that a recourse to only a few localities was usually observed before a resort to Colorado. The unfortunate fact remains that in a great many instances the patient has exhausted the climatic influences of the entire country in a vain effort to secure arrestment, before applying to Colorado as a court of last appeal. As a fair illustrative example I will cite the following brief and imperfect report: Mrs. X., aged 29, New York State. Arrived in Colorado Feb. 11, 1898. Present illness began October, 1896. Two months later was sent to Thomasville, Ga. Remained two months; improved; was directed by her physician to Aiken, S. C.; remained one month; gained. Returned to New York; remained three months and failed; successively sent for short periods to Canada, Northern New York, Bethlehem, N. H., and advised to return to New York City, where she was for three months under daily inoculations with oxytuberculin. She was finally sent to Colorado, one year and four months after recognition of disease, equipped with special hypodermic syringe and a full complement of the tuberculin, but with exhausted energies, depleted finances and extensive infection both lungs, moderate pyrexia, severe distressi cough with copious expectoration, disturbed dige tion, loss of weight, cardiac excitement and insomni I will state that the patient is improving at the pre ent time and is likely to remain for a considera period in Colorado, in spite of the adviser in N York, who is, even now, counseling another chan It seems strange that patients should receive dir tions to keep constantly on the move, irrespective adaptability to climatic conditions and of benef already received in any location.

It is to be regretted that certain physicians ha seen fit to order their patients away from home wi instructions to beware of the doctors, or at most, secure an opinion as to results obtained after the lap of several months. Unfortunately many of these a compelled to seek medical aid much sooner th anticipated as a direct result of the injudicious co sel of their home advisers, with reference to exerci work or manner of living. It is safe to say th nearly one-third of the pulmonary invalids seekin direction in Colorado for the first time, present t history of several months' residence in the Sta usually under decidedly improper conditions and wi unsatisfactory results thus far attained.

The spectacle is also occasionally witnessed of t physician, who has perchance never been in th region, presuming to dictate in advance, or later at distance of 1000 or 2000 miles, the policy of ther peutic management. There came under my observ tion not long ago a young man from an eastern ci who, during a period of six months' residence in Co orado, had prepared fortnightly cover-glass specime of the sputum, to be mailed to his physician in t east. The cheering intelligence was regularly r turned that the bacilli were diminishing in numb and that favorable progress was being maintaine The actual results attained were as unsatisfactory could have been expected from the character of t medical advice. It does seem that there should be tremendous liability for such errors of profession judgment as are responsible for the loss of human li and happiness, and for which there can be said to exi no extenuating circumstances. From the history an character of the cases almost daily coming und observation in this climate it would appear that t medical counsel was occasionally delivered witho the encumbrance of knowledge or the handicap conscience. Is it not fitting in a discussion of th character to enter an emphatic protest against the i discriminate character of the medical advice frequent given with reference to the question of an appropria climatic change? As far as pertains to Colorado, can only report that cases suitable for this clima should come early, come to stay, and come prepare to receive competent counsel.

Despite the rather unsatisfactory character of th cases generally observed in this State, the combine results of climatic influence and management a nevertheless extremely gratifying. From my ow experience and that of my colleagues in Colorado, am sustained in stating that, in round numbers, fro two-thirds to three-fourths of all cases taken as the come may be expected to exhibit pronounced improv ment under proper conditions. Instances of incipie pulmonary involvement constituting, as they do, bu one-fifth of the entire number, show material gain. not permanent arrestment, in nearly four-fifths

ese cases. If with slight tubercular infection is mbined other favorable considerations with refer- ce to temperament, nervous system, digestion, finan- s, and domestic relations, the percentage of improve- ent in such instances is raised to 90. The authen- city of these statements is subject to verification by reviewed analysis of my own recorded cases and the ported observations of others. The significance of ese figures is remarkable in view of the obvious diffi- lties constantly experienced in maintaining a strict d proper regimen for somewhat indefinite periods. he fact that but one-fifth of all the cases observed Colorado are incipient ones, and that the accorded sults of the climatic change are not relatively in- eased, reflects a certain responsibility upon the neral profession and offers a justification for these marks.

In the midst of the present enthusiasm and inter- t in the treatment of pulmonary tuberculosis, the udable search by strictly scientific men for new and pecific remedies, the undue haste in heralding the sults of serum-therapy as applied frequently to a mited number of cases totally devoid of adaptation the means employed, and in the midst of the nfortunate tendency to experiment with the various pecial methods in private practice, to the exclusion climatic considerations and systematic manage- ent, let me ask, "What have been the ultimate uthentic results?" It is comparatively easy to sound e praises of certain methods and ingenious appli- nces, but, after all, "the proof of the pudding is the eating." Have the patients shown a satisfac- ry and enduring improvement? The arguments hould be summed up and conclusions reached with eference to the practical results upon the unfortu- ate consumptive, rather than from laboratory infer- nces derived from guinea pigs. The alleged immu- ization of this animal is of but slight interest or alue to the pulmonary invalid, if the modified tuber- ulin preparations are to continue to exert their dis- inctly deleterious influence upon the course of the isease. What well-substantiated clinical evidence as as yet been adduced to justify, in the slightest egree, the increasing employment of such prepara- ions outside of carefully-conducted experimental nstitutions? Great interest has been attracted of late o the new tuberculin of Koch, the derived serum of Fisch, and the oxytuberculin of Hirschfelder. The ater German consensus of opinion upon tuberculin reparations may be safely considered to reflect more avorable estimates upon their present utility than ould be generally entertained elsewhere in any esponsible manner. The extent of German disfavor pon the use of the new tuberculin, from the latest linical reports, is well understood. Numerous authori- ies in Europe, from their own personal experience, ave unhesitatingly stamped their disapproval of its mployment. The following from the *Philadelphia Medical Journal* of March 12, 1898, possesses much ignificance in this connection:

> At the last three meetings of the staff of the Charité, Ber- in's largest public hospital, the therapeutic worth of Koch's ew tuberculin was discussed. It is now in use over ten onths and some definite conclusion as to its specific thera- eutic efficacy, it would seem, should be given to the profession t large, who look to those with hospital opportunities and aterial for practical results. Not a single voice was raised in ts favor, except that of Professor Brieger, Koch's assistant n the institution for infectious diseases, and even that voice, t must be confessed, in somewhat apologetic tone rather than n any convincing way.

The *Medical News* of March 19, 1898, contains an interesting reference to the clinical discussions at the Charité and to the absolute failure to produce immunization in animals with the new tuberculin. It states:

> The experiments seem to have been carefully carried out, the dosage of tuberculin was exact and sufficient and the observations numerous enough to do away with the idea that perhaps coincidence played a rôle in the results obtained, and yet there was utter failure to get the desired immunity. . . . After supposed immunization, all the animals died when inoculated with tuberculous material, and, interesting enough, most of them before the control-animals inoculated with the same material at the same time. . . . The history of the second tuberculin forms an interesting commentary on the enthusiastic reception of the first. In Berlin it has had practically the effect of destroying faith in all so-called specific remedies for tuberculosis. Constitutional treatment is now the only method receiving any attention.

Subsequent to the decision of the Académie de Médecine of Paris, that the therapeutic value of oxytuberculin had not been established by sufficient experimentation, a committee of the Cooper Medical College of San Francisco was appointed to institute an investigation and render a detailed report upon this remedy. The committee has bestowed its unqualified endorsement of oxytuberculin and urged its extended use. From a review of the published evidence presented to the committee, upon which its findings were based, I am unable personally to accept their conclusions, on the ground of insufficient clinical testimony. The reported results of other observers, as far as I am able to ascertain, have since been quite unsatisfactory. My own experience with various tuberculin preparations, save for occasional diagnostic purposes, has been limited to observation of results from their antecedent employment. I have never considered the request of the patient for the use of tuberculin a sufficient justification for its administration, adjudging this to be in the same category with similar appeals for morphin or the performance of ovariotomy if contrary to the judgment of the attending physician. Despite protestations to the contrary, from lay and professional sources, the patient is unable to assume the entire burden of responsibility in such cases.

A very considerable number of cases have subjected themselves to my care, presenting the history of several months' daily inoculation with tuberculin preparations prior to arrival in Colorado. In none of these have I been able to secure a statement of favorable results attending its employment, save in the occasional instances of conjoined climatic influence. The record has almost invariably shown subsequent failure, which with the involved loss of time, in early stages, must constitute a factor of no mean importance. It is manifestly fair, for the purposes of comparison, to allude briefly to those who have come under my observation, following the use of various tuberculin injections in Colorado under the same climatic conditions. Admittedly a certain proportion of such cases should be expected to exhibit improvement from the climatic change, irrespective of therapeutic management. I have been rather surprised, therefore, to note the generally unsatisfactory results attained by those in this class whom I have had opportunity to observe. I can recall no instance in which, from a review of the history of the case after arrival, material improvement could be inferred to have taken place during the inoculations. Of further significance, I can conscientiously report a marked gain in the majority of such cases upon

cessation of special treatment and the observation of rational methods with strict insistence upon appropriate daily regimen.

Relative to the reported experience with tuberculin preparations of some of my colleagues in Colorado, I can not refrain from the statement that I can see no justification for their employment in this State, nor any scientific value to be derived from such observations. It is recognized by even their warmest advocates that their use should be limited chiefly to early cases. It is precisely such cases that have been demonstrated to respond most readily to the favorable influences of the climate. I submit the proposition that such cases, showing an exceedingly large percentage of improvement from climatic conditions, should not be lightly subjected to the influence of a powerful agent, the utility of which as yet remains undemonstrated by clinical experience or laboratory investigations. I insist, also, that the improvement reported in early cases during the first year in Colorado is no evidence that benefit was derived from the coincident employment of serum-therapy. Further, inasmuch as the use of tuberculin preparations is not considered to be generally applicable to cases with more extensive infection, there would seem to be still less excuse for its indiscriminate administration in Colorado in cases to which this means is not adapted according to its most experienced and enthusiastic supporters.

It has been suggested by some that the moral effect, if nothing more, of daily inoculations should exert a favorable influence upon the pulmonary invalid. This is presumably advocated from the apparent hopelessness of many cases, the inability for various reasons to enforce proper therapeutic management, and the desirability of producing a suitable impression upon the patient to the effect that definite means are being constantly employed for his relief. I am convinced, from my own experience, that the moral effect of this is distinctly bad. I have repeatedly had occasion to observe the increased susceptibility of pulmonary invalids to depressing or exciting influences. The mental effect of the daily subjection of such patients to this procedure, with the prolonged confinement in the physician's office, with its incidental annoyances, must necessarily be disturbing and depressing. Added to this, should be considered the enforced infringement of systematic management pertaining to an unbroken period of rest with as many hours daily of sunshine and of fresh air as possible, removed from the thickly settled portion of a city like Denver. The trip to town, with its frequent delays, is sufficient to completely destroy the entire system of regimen for the half day at least, interfering with proper nourishment between meals, interrupting naps, or periods of rest, and affording varying degrees of physical exhaustion, with disquieting if not depressing mental influences.

I have found it to be comparatively easy and infinitely more satisfactory to appeal directly to the intelligence of the patient by a judicious explanation of the situation, securing thereby a more active and hearty co-operation. The personal influence of the local physician, with the establishment of confidence and trust, is calculated to produce an effect for good far greater than the moral influence of routine hypodermic injections.

I present these very common-place remarks with much hesitation, but with the conviction that relative to a subject of such importance no harm can result from a plain statement of facts gathered from personal experience.

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## ACCIDENTS IN EYE OPERATIONS.

Presented to the Section on Ophthalmology at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY F. C. HEATH, M.D.

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While it is more flattering to one's vanity to record successes, it is often quite as profitable to study failures and embarrassments, with a view to learning how to avoid or master them in the future. It will be the aim of this paper to consider briefly a few accidents occurring in eye operations.

Some years ago, as I was making a paracentesis in an Irishman's eye with a Graefe knife, the patient made a sudden violent movement on the entrance of the knife point into the anterior chamber. A serious accident in this case was avoided by depressing the handle of the knife quickly so that the point could not injure the lens, but a good lesson was learned—not to operate too soon after instilling cocain. A more serious accident occurred on attempting to do an iridectomy, without an assistant, on an intractable patient who moved her eye violently at the worst possible moment, causing considerable irido-dialysis. In this case two mistakes were made. The first was in attempting to use the scissors with the left hand; it is much easier to operate with the scissors in the right and forceps in the left hand. I am inclined to think, however, that it is usually a mistake to do an iridectomy without an assistant, although I have many times done so successfully, and many will agree with Dr. Reeves' statement at the Montreal meeting of the British Medical Association that "it is better to operate alone than to have unskilled assistance, such a term can be used."

Of greater interest than these are my embarrassing experiences in three cataract cases, and they form the occasion for writing this paper. In case first the combined operation was performed. On cutting the iris the hemorrhage was profuse; the anterior chamber was soon filled completely and the blood could not be removed in the manner ordinarily advised, nor any other so far as I could see at that time. The capsulotomy and delivery was therefore done in the dark, so to speak, and considerable cortical matter remained. The blood was absorbed in a day or two and the eye healed rapidly, but the lens matter uniting with the capsule formed a secondary cataract. This was left to nature, and while absorption was slow the patient ultimately obtained very useful vision. Possibly using a cold compress for some time to cause the blood to coagulate, and then removing the clot with forceps, would have obviated all difficulty as to extraction of the lens in this case.

Case second was most unfortunate. This patient had the most deeply seated eyes I ever saw, which not only increased the difficulties of the operation, but made subsequent examinations very difficult and unsatisfactory, as the upper lid could not be raised without touching the inflamed eyeball. Although the patient saw well at the close of the operation, and I could not see any lens matter remaining, I felt that

had failed to make a complete delivery. Later on one loose lens matter was found forcing apart the lips of the wound and was easily removed, but it had already set up a cyclitis which was followed by sympathetic inflammation of the other eye, necessitating enucleation of the exciting eye. The result was particularly deplorable, as the sight in the remaining eye, on which I had done a successful extraction the previous year, was considerably impaired. There is additional disappointment, perhaps due to the fact that I had done double cataract extractions on two of his friends with a resulting vision of nearly 20/20 in each eye. Earlier removal of loose lens matter might have prevented the cyclitis, and earlier enucleation would certainly have been better for the sight of the other eye, but this case was at a distance from me and could not be seen as often as I wished. In case third the nucleus of the lens with the thickened capsule dropped down into the vitreous, the capsule remaining attached above so that it swung as if upon a hinge. Efforts to get hold of it and extract failed, although a properly made wire loop might possibly have been used successfully. The eye was closed and a cool compress of cotton applied for a half hour, in the hope that the anterior chamber would refill and the lens float back into position, as it were. At the end of that time, the aqueous showing no tendency to reform and the cornea remaining depressed and collapsed, the usual dressings were applied. A little vitreous had been lost and its appearance indicated the occurrence of liquefaction. At the end of twenty-four hours the anterior chamber was re-established and the lens had come up into place. It was then a question whether to attempt its immediate removal or leave it to nature (supplementing what nature failed to do in the way of absorption by a secondary operation later on). The success of this course with case first, and the fact that the patient was a nervous invalid, led to the adoption of the latter plan. The corneal wound healed kindly and there was but little iritis, slight adhesions below serving to fix the lens and capsule more firmly in place. The iritis having subsided, we began to consider the question of a secondary operation, when the patient, who had long been an invalid, commenced to decline and soon died from causes having no connection with the eye or operation. It is, therefore, a matter of speculation whether it would have been wiser in this case to have gone down to the vitreous with a wire loop immediately, or attempted the extraction of the lens remnant the day following, in lieu of the conservative course adopted. I hope this phase of the subject will be thoroughly discussed.

The text-books at my command say comparatively little about accidents in operations. deSchweinitz gives the most, but even he does not cover all the points connected with such cases as I have here reported. Of such accidents as the iris falling in front of the knife I have had no experience, nor have I ever lost much vitreous. In one case only have I been compelled to enlarge my corneal incision. The accidents mentioned in this paper have been the worst in my experience, but they have taught me such valuable lessons that I thought it might be more profitable to report them than my successes, hoping that the discussion thus introduced might bring out many points of value to those who feel there is yet something to be learned in this branch of our art.

17 West Ohio Street.

## AN INEXPENSIVE 60-LENS OPHTHALMOSCOPE WITHOUT REKOSS-DISC.

Presented to the Section on Ophthalmology at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY GEORGE M. GOULD, M.D.

PHILADELPHIA.

It is said that if within five years after graduation an oculist does not devise "A New Ophthalmoscope" his wife and intimate friends begin to make mysterious visits to the best alienists concerning the man's mental condition. I have concluded that it will not do for me to hold out any longer. The little device I show you today is designed to give the working oculist an instrument with double or treble the number of useful lenses in the ordinary ophthalmoscope, without the complicated and bothersome Rekoss-disc, without a handle, that does not need a case, and that is comparatively inexpensive. The lenses are arranged in two sets independent of each other, each set in parallel continuous grooves or channels similar to the Morton instrument in this one respect. Each set of lenses is propelled by a drive-wheel operating a toothed wheel for each of the two sets of lenses, this having a disc on which is the designation of the particular lens at any time before the sight hole. The set of lenses in one end of the ophthalmoscope contains the lenses most used by an emmetropic oculist, and all the rarely-used lenses are in the set at the reverse end. A highly ametropic oculist could have a different set of lenses placed in the most-used end according to his personal needs. The mirror, instead of tilting to either side, is reversible on its axis and thus can be placed at any angle desired for use when patients are in bed or with the light in any direction. The mirror is readily taken out and inserted in either end of the instrument. Side-illumination is excluded by a tube containing the mirror and the body of the instrument. The instrument itself is used as a handle. The arrangement of the lenses is as follows:

| At one Extremity (that most used.) | | At the other Extremity (that less used.) | |
|---|---|---|---|
| Concave. | Convex. | Concave. | Convex. |
| . . | . . | 8.00 | 8.00 |
| . . | . . | 8.50 | 8.50 |
| 0.50 | 0.50 | 9.00 | 9.00 |
| 1.00 | 1.00 | 9.50 | 9.50 |
| 1.50 | 1.50 | 10.00 | 10.00 |
| 2.00 | 2.00 | 10.50 | 11.00 |
| 2.50 | 2.50 | 11.00 | 12.00 |
| 3.00 | 3.00 | 12.00 | 14.00 |
| 3.50 | 3.50 | 13.00 | 16.00 |
| 4.00 | 4.00 | 14.00 | 18.00 |
| 4.50 | 4.50 | 15.00 | 20.00 |
| 5.00 | 5.00 | 16.00 | 25.00 |
| 5.50 | 5.50 | 18.00 | 30.00 |
| 6.00 | 6.00 | 20.00 | . . |
| 6.50 | 6.50 | 25.00 | . . |
| 7.00 | 7.00 | 30.00 | . . |
| 7.50 | . . | 40.00 | . . |

The present crude instrument, the first one made, is designed to show its essential principles and methods; the finished instrument will be made of aluminum, and therefore much lighter in weight.

## DEMONSTRATION OF AN "AUTOFUNDOSCOPE."

Presented to the Section on Ophthalmology, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY GEORGE M. GOULD, M.D.

PHILADELPHIA, PA.

The little device for which I have dared to coin the

terrible word "Autofundoscope," is a very simple bit of mechanism, designed to slowly and accurately revolve a pin-hole through, and placed about two millimeters from, the center of a black rubber disc. The word should have been *autoretinoscope*, but as *retinoscopy* has been given another signification, *autofundoscope* is the only word left to designate the observation of the vascular system of one's own retina. The method essentially is the very old one described in books on physiologic optics of moving a pin-perforated card, held in the hand, before the eye, and observing an illuminated blank space through the perforation. In this way, however, one secures only faint, movable and indefinite images of the retinal vessels, which disappear and reappear with provoking rapidity. The common newspaper puzzle of revolving concentric alternate circles of black and white rings, when upon stopping the movement, the circles seem still to revolve, suggested to me this improvement and device. Both facts rest upon conditions explained in books on optics, which you well know—the position of the capillaries in front of the retina, the shadows they cast, the physiologic influence of fatigue, and the slight change in the position of the shadows affected by the revolving perforated disc. One may place the instrument, without the tube, five or ten feet from a brilliantly illuminated white card-board, and thus obtain a very fair and steady image of the macular region and the entire perimacular vascular system. A little patience and considerable care is needed to hold the eye very steady, at the right angle, and to rotate the disc at exactly the requisite rapidity and uniformity to bring out the image most perfectly and immovably. Had I thought the experiment worth the expense and trouble, it would have been possible to provide an automatic clock-work mechanism much superior to the present crude device.

Physiologically the method is something more than a curiosity, as showing one the exact shape and relative dimensions of his yellow spot of Sömmering, or macular region; the comparison of the different picture of the two eyes; the perfection of the vascular supply of the retina, etc. I have been astonished to see how clearly the finest capillaries are seen, how much closer they penetrate to the macula than I supposed, etc.

I can imagine that the method may have use in demonstrations of pathologic conditions, but all such must depend upon the fact that it is only one's own retina that one can thus see. I have noticed in my own images certain opalescent spots in the perimacular space, invariable in each eye, though entirely different for each, in size, number and location. I do not know what causes them. They are not muscæ.

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## THERAPEUTIC VALUE OF SOME MEDICINAL AGENTS IN PHYSICAL DISEASES AND SOME PSYCHICAL TROUBLES.

Presented to the Section of Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY T. B. GREENLEY, M.D.

MEADOW LAWN, KY.

It has occurred to me that a short sketch of the value of a few remedies I have used with good results in certain cases, might be appropriate.

First, I will speak of spirits of turpentine. I have found it to be one of the best antihemorrhagics I have used. I regard it almost as a specific in hematur... Within the last year I have had some ten cases this trouble. I give small doses frequently repeate... say fifteen drops at intervals of three or four hou... As a matter of convenience I give on sugar in a te... spoon, instead of preparing an emulsion. Of cours... in order to aid the action of the remedy I freely e... ploy dry cupping over the kidneys. Usually ... twenty-four to thirty-six hours the bleeding is arrest... In hemoptysis, either from the stomach or lungs, it ... an admirable remedy, especially so when due ... trauma. I also use it in hemorrhage from the bow... and uterus. In the latter case ergot would great... assist the turpentine. In oozing of blood from t... surface of a wound, it is not only antihemorrhag... but also antiseptic, and at the same time exerts so... healing property. In cases of bowel affections, whe... flatulency is present, turpentine serves an admirab... effect in its relief. The most painful and unple... ant symptom in typhoid fever is flatulency of t... bowels. Turpentine in such cases is our best remed... Beside removing the painful distension of the organ... it also serves as an excellent antiseptic. It is also ... fairly good vermifuge. In old times when interm... tent fevers were so prevalent in the Ohio valley, a... quinin so high priced, and when I had so muc... charity practice to do, I studied up an antichill med... cine, of which turpentine was the principal ingred... ent. It had the desired effect in arresting the disease... As quinin at present is so low in price, it is not wor... while to speak of the formula.

In speaking of the virtues of turpentine, I do n... wish it understood that I regard it a king cure-all, ... some of the patent medicine proprietors assert the... preparations to be.

Next I would mention ammonium chlorid as ... alterative in certain hypertrophies, etc. I have use... it in enlargement of the spleen and liver with ve... happy effect. A case of the largest spleen I ever s... was that of a lady about forty years old, who lived ... a very malarious locality. The organ had extend... considerably across the median line, producing qui... a prominence of the abdomen. I put her on t... chlorid and continued it several months. The sple... gradually became greatly reduced, relieving t... patient of much discomfort from weight and diste... tion. While using the chlorid, I had the patie... apply irritants, such as tinct. iodin, turpentine, et... over the abdomen, and two or three times drawi... blisters with fly plasters. These agents were aide... by adjuvants in the way of tonics and laxatives, ... quinin, etc. The patient finally recovered her usu... health.

I have also used the chlorid in hypertrophy of t... liver with very happy results. In these cases, ... have to use, aside from the alterative, such adjuva... as are indicated in each particular case. I was ve... much gratified by its use in a case of chronic pne... monia in a woman of some thirty years of age. H... acute attack occurred some six or eight months b... fore I saw her. She was up and able to attend to h... household matters, but complained of pain in b... right side, and had a troublesome cough. On exa... ining her I found consolidation of lower lobe of rig... lung. I put her on the chlorid of ammonia and bl... tered the surface over the part of lung involved. T... suface was kept partially raw by repeating the plast... when necessary, At the end of four or five wee... the lung was restored to its normal condition. T...

atment was aided by medicines to promote appe- and aid digestion, as tonics, etc. The chlorid is e of my favorite remedies in sore throat, especially en it is accompanied with hoarseness. I prepare yrup of the following formula:

℞ Ammonium chlorid
Sodium bromid
Chloral hydrate, aa ʒv
Syrupus simplex (½ pint) Oss.
M. and Sig. Teaspoonful swallowed slowly.

This syrup also serves as an admirable cough medi- e. In taking it for sore throat it should be swal- wed slowly, as before remarked, and nothing else ken for some ten minutes or more, so as to afford e for its local action on the mucous surface of the roat.

In irritable cough due to the effect of cold, in bron- itis or phthisis, where sleep is greatly interfered th, this syrup will be found a most admirable medy. On retiring take a teaspoonful and if not lieved in fifteen or twenty minutes repeat the dose, d as a rule, in a short time rest and sleep will be cured. I keep this syrup, already prepared, in my ice, ready to dispense in all such cases as those luded to. In cases where the cough is tight, I add ittle syrup of ipecac to each dose.

When a man practices medicine over fifty years it not an unusual thing for him to have some favorite medies, or you might say hobbies in medicine. I ust acknowledge I am one of the old time fogies ho believe we can not with safety lay aside our old armacopeial remedies for the late preparations in armacy, although I am not prejudiced against em and frequently use some of them.

In some instances we can, with advantage, combine me of the preparations. I have been fortunate in is respect in combining two of the chlorids as a ick alterative. Some fifteen years ago I was called see a child with membranous croup. The little ing was in its mother's lap, gasping for breath, with king at the upper and lower end of the sternum. told its mother the baby was virtually dying. She gged me to do something, and to gratify her I put some medicine I had never used before in that sease, but told her I had no hope of relieving the ild, as I had seen only one case in over thirty-five ars get well. I combined the protochlorid of mer- ry—calomel—with the chlorid of ammonia, one ain each, in powders to be given every two hours, e child being about fifteen months old. It was in e morning, and I told the mother if the child lived rough the day and night to let me know next morn- g. When I saw her little boy coming to the house, supposed he was sent to let me know the patient was ad, but happily, on inquiry, he informed me it was tter and wished me to see it again. I very gladly swered the request and found my patient greatly proved, in fact out of danger.

Since then I have treated six other cases of the isease in the same way, with the same happy results. omitted to say that in conjunction with the inter- al remedies I had a towel, kept wet with warm water, plied around the child's neck, so as to keep the arts relaxed. The only case of true croup I ever w recover, before the widow's child above spoken , was treated by the method recommended by Dr. reen of New York, over fifty years ago. He, with a iece of sponge fastened to the end of a whalebone robang, dipped into a strong solution of nitrate of silver, introduced it into the child's glotis. I only tried this treatment in one case, the one before alluded to, and never had the heart to repeat it. The treatment and its effect was explained to the parents, and as the child was nearly moribund, they requested me to do anything that offered any possible chance to save its life. Dr. Green had reported several cases cured by this plan of treatment. In speaking of my plan of treating croup, it was feared by some that bichlorid of mercury would result, by the combination of the two chlorids, but I have never observed any unpleasant effects resulting from their union.

In old times, as a general thing, we treated croup with emetics, syrups, etc., but only to look on and wait for death to relieve the patient. Fortunately, membranous or true croup is comparatively a rare disease.

Respecting the medicinal virtues of nux vomica, I have used this agent in the form of normal liquid, mostly, as a tonic and alterative, for many years. I use it as a heart tonic in most cases of debility of that organ, in preference to the ordinary heart tonics, such as digitalis, strophanthus, convallaria, cactina, etc. In cases of rapid action of the organ, digitalis for a short time might be preferable. I also give it in debility of the muscular coats of the stomach and bowels, resulting in dyspepsia and constipation. By toning up the muscles of these organs, relief is afforded in many instances. I have also relieved paralysis of the bladder in a short time with nux and belladonna. I have relieved one case of locomotor ataxia with these two remedies. It was in the early stages of the disease.

In regard to fads in medicine, I might say a few words respecting a favorite prescription I use in diarrhea. I have used it for this trouble for several years, and find it almost a specific, especially so in summer complaint of children. It is as follows:

| | | |
|---|---|---|
| Paregoric | ʒ ij | 62 206 |
| Ext. witch hazel | ʒ j | 31 103 |
| Carbolic acid | ʒ j | 3 887 |
| F. Ext. Kino | ʒ ij | 7 775 |
| Jamaica ginger | ʒ ij | 7 775 |
| Precipitated chalk | ʒ j | 3 887 |
| Simple syrup to make | ʒ viii | 248 82 |

Mix thoroughly and always shake bottle well before dosing. For an adult a teaspoonful is a dose, to be repeated at intervals of three hours, until desired effects result. Dose for children in proportion to age.

Perhaps I have said enough respecting favorite remedies, and will say a few words in regard to medicines which prove to have psychologic effects, or cure imaginary diseases. It is frequently the case that such troubles come under our observation. I am at times at a loss whether to term these cases psychologic or due mainly to credulity. Sometimes I think a great many people are hypnotized by their credulity in the virtues of certain so-called remedies, and will take them for months, or even years, for imaginary troubles. In some cases of this character the so-called remedy, by its long continuance, produces derangement of some organ or organs, if not actual disease. I have known cases of this character. We are occasionally puzzled how to treat successfully some cases of hysteria. Patients of this class are easily affected by suggestion, and when we thoroughly acquaint ourselves with their peculiarities, we are much better enabled to manage them. You have, in a great measure, to treat the mind. In the first place gain their confidence that you can cure

them. I recollect having a case years ago, a girl about twenty years of age, who was laboring under the belief that she was paralyzed in one leg and arm. These spells of paralysis, I soon discovered, were intermittent in character. When I learned this and got the run of her symptoms, as expressed by herself and her mother, I assured her that I could cure her. I put her on a simple plan of treatment, and requested her mother to be very particular in observing my directions. I did this in her presence, laying a good deal of stress on small matters, such as massage of the parts, diet, etc. On my next visit she was a great deal better of the paralysis, but had a spell in the night different from any she had before. Her mother described the symptoms to me in her presence and wished I had been there to see how she was affected. I was well satisfied that after her mother's description of the attack in the night, I would soon see it repeated. Sure enough, in less than an hour a similar spell came on, which was of a convulsive character. After it was over I called her mother aside and charged her not to speak of her case in the presence of any one again, as it was a suggestion to the patient to repeat the symptoms. On my assurance that she would get well by observing my directions in every particular and that she would be well by the time I came back in two days, she was satisfied and was all right on my next visit.

I might speak of another case of hysteria in a young woman, who came to the conclusion she could not speak above a whisper. She was apparently in good health otherwise. I put up a little medicine to be taken at regular intervals, with a solution to be applied to her throat with a feather, at the same time she took the medicine, and also used external applications, assuring her that by following the directions strictly she would be able to talk when I returned. She was all right on my next visit. She had not talked above a whisper for two weeks. More cases of a psychologic character might be mentioned, but those alluded to are sufficient for the present occasion. In fact, we should, to some extent, treat the mind in a majority of cases. There are many patients of a more or less nervous temperament laboring under physical ailment, where assurance to the mind that they will get well, is of great benefit.

We, as regular medical men, have now and then been charged, and in some cases truthfully, of administering bread pills in cases of imaginary diseases. But our homeopathic friends can beat us two to one in hypnotizing a patient when there is not much the matter. They will put up their granules of charcoal, chalk or sulphur and tell the patient to take them at regular intervals and strictly obey the directions about diet, etc., and he will certainly get well. The assurance of getting well and the observance of the dietary are the elements of success in such cases. It would be a good thing on our part if we would treat the minds of our patients more carefully than we do.

**Salophen in Articular Rheumatism.**—The gastric disturbances that frequently follow the prolonged use of sodium salicylate in rheumatism, can be avoided if after three to five days' treatment, and the disappearance of the principal morbid manifestations of acute articular rheumatism, salophen is substituted, giving 2 to 3 grams a day. Salophen passes through the stomach unchanged, to be split into salicylic acid and acetylparalidophenol in the intestines, and can be administered without inconvenience until all fear of a relapse is past.—Professor Mosler of Greifswald, *Semaine Méd.*, Sept. 7.

## THE SULPHOCARBOLATES.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7–10, 1898.

BY WILLIAM F. WAUGH, A.M., M.D.
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CHICAGO, ILL.

The earliest mention I have been able to find of the sulphocarbolates as remedial agents is by Sansom in the *Practitioner*, iii, 5–13, 1869. Papers by him upon these salts also appear in the *British Medical Journal* in 1870, and in the Transactions of the Obstetrical Society of London, 1870–71. Sansom claimed that the sulphocarbolates were beneficial in phthisis, typhoid fever and the eruptive fevers, especially scarlatina, for which he considered them specific.

Subsequently papers upon these salts have been contributed by Q. C. Smith (*Nashville Journal of Med. and Sur.*, 1878); D. Cerna (*Philadelphia Med. Times*, 1879–80); Withers (*Dublin Jour. of Med. Sciences*, 1880); H. P. Farnham *Medical Record*, xxiii, 8, 1883), and F. Vigier (*Bull. et Mem. Soc. de Thera.*, 1884). Since the latter date there have been few papers listed under this title, but every year see an increasing number of references to the sulphocarbolates in the treatment of various affections.

Leading manufacturing chemists furnish the carbolates of zinc, soda, lime, potash and ammonia. The sulphocarbolate of zinc, $Zn(SO_3C_6H_4OH_2)8H_2O$, is prepared by decomposing barium sulphocarbolate by zinc sulphate, filtering off the barium sulphate and evaporating. It forms beautiful white crystals when pure. It is soluble in twice its weight of water or of alcohol, and has no acid reaction. The aqueous solution becomes violet on the addition of ferric chlorid; should yield but a slight turbidity with barium nitrate; is unaffected by ammonium oxalate or by sulphuric acid, and after precipitation by an excess of ammonium sulphid the filtrate on evaporation and ignition should yield no residue. Heated to redness it yields 14.6 per cent. of zinc oxid.

My attention was attracted to the value of zinc sulphocarbolate in 1881, by Dr. C. L. Mitchell, who found it of much merit as a local application. The first use I made of it was in the various forms of summer diarrhea, especially in cholera infantum. In this affection I had noted the coldness of the extremities, with heat of the forehead and the epigastrium, contracted pupils and small rapid pulse with profound depression of the vital forces. Precisely similar conditions are manifested in nasal diphtheria, excepting the epigastric heat: and yet all these subside promptly when the nasal passages have been thoroughly cleansed and the absorption of toxins generated in the nasal passages has stopped. The radical and immediate change for the better following such a cleansing by hydrogen dioxid solution had made a strong impression upon me, and when I noted the same aggregation of symptoms in cholera infantum, it was obvious that the cause was here also a toxin absorption, and that the long-sought remedy was to be found in the antiseptic group.

The first experiments were made with much difficulty. The sulphocarbolate was generally so impure that half a grain excited local irritation and vomiting. But when the chemically pure salts were obtained it was found that a child in the second summer could take from one-half to one grain every half

our with impunity; and with this dosage the method t once gave evidence of its value. So remarkable as been the change effected by this remedy that it s now more than fifteen years since I have had a hild die of cholera infantum, and I am convinced hat the circumstances must be rare in which a child roperly fed, with proper attention to the sanitary ondition of the premises, and treated with the sulpho-arbolate of zinc, will yet die of cholera infantum.

From this was readily deduced the employment of he same remedy in all other affections of the alimen-ary canal attended with decomposition or fermenta-ion, as evidenced by fetid or unhealthy stools, and he symptoms now known to be due to autotoxemia rom fecal absorption. The importance of this prin-iple in the genesis of symptoms manifested in the ervous, circulatory or respiratory system, or in any ther part of the body, is beginning to be realized, nd would probably degenerate into a "fad," if such nthusiastic adoption ever occurred to a truth. But it is only such discoveries as Perkins' tractors, Ber-eon's gas inflations, and tuberculin, that receive the nstant and unanimous approval of the public. Truths, ike vaccination and intestinal sepsis, must fight their way to acceptance.

The next trial of the sulphocarbolates was in typhoid fever. It requires, on an average, forty grains daily to render the stools of a typhoid patient odorless; but in some instances it has required 120 grains daily. This amount is easily taken and does not irritate, if a pure salt is employed. As a rule, I prefer to give it in powder, with a few grains of bis-muth subnitrate, or in the pills made by the Upjohn process. When the stools have become inodorous, the following alteration has occurred in the condition of the patient: The diarrhea, tympanites, pain, ten-derness, distention and gurgling in the abdomen have ceased; the aching of the head and the muscles, noc-turnal delirium and ataxic symptoms have disap-peared; the tongue has become moist and clean; the appetite has returned; the mind is clearer, and the temperature has fallen from one to two degr es. In fact, the case has been reduced to the category of the mild form, the temperature falling below 103 degrees, the point at which advocates of the Brand method employ cold baths. Many cases are aborted, and of those in which the physician is called so early that a diagnosis is not sure except by bacteriologic methods, but where the conviction is that we are dealing with the initial stage of typhoid, nearly every case is stopped within four days. If, as I believe, the action of zinc sulphocarbolate is limited to the alimentary canal, the symptoms relieved by the administration of this drug are fairly to be attributed to absorption of toxins from the bowels, and the attack is reduced to the direct effects of such bacteria as have migrated beyond the alimentary canal before the drug is given.

These effects are as uniform as those of any drug given as medicine; they have been noted in numer-ous cases, without a single exception. The proof is so easy and so complete, that it only remains to ex-plain how these effects are produced. It seems evi-dent that the zinc is not a germicide; that it acts by preventing the multiplication and functioning of micro-organisms, rather than by directly destroying them. Indeed, it seems doubtful if any germicide can be introduced into the alimentary canal in suffi-cient strength to kill bacteria and yet not injure the patient. But the bile does not kill spores, and yet the absence of the bile occasions a large part of the symptomatology of all febrile diseases. Fever checks the secretion of bile, and this, with the increased heat and lowered vitality, favors the action of micro-organisms in the whole alimentary canal. The food, not properly digested, also decomposes more readily than in health, and this adds another element. It follows, then, that in every febrile affection intesti-nal sepsis and autotoxemia are necessarily present and furnish a share of the symptomatology. Hence, the use of the sulphocarbolate is indicated in all fevers, not alone those that have their focus of operations in the bowels, like typhoid. In pneumonia, for instance, a reduction of the temperature and a corresponding amelioration of the symptoms follow the sulphocar-bolate antisepsis, and this method may be prophy-lactic also, as it is known that the pneumonia is especially fatal if vomiting and diarrhea complicate it.

This brings us to the latest development of sulpho-carbolate therapy—its use in tubercular phthisis. As the salt had reduced the temperature so certainly in all other forms of febrile disease, I concluded to give it in a case of pulmonary tuberculosis, with countless bacilli, high fever—104 degrees and over—and the nausea, anorexia, indigestion and diarrhea usual in such severe cases. The patient improved at once, the fever dropping to 100 or 101 degrees, and the gastro-intestinal symptoms completely disappearing, leaving the patient with the appetite and digestion of a plowboy. As other remedies were employed, I can not credit the cure, in this case, to the sulphocarbo-late alone, but as Dickson used to say that we could cure consumption when we learned to control the digestive difficulties, I am sure the sulphocarbolate contributed largely.

It may be asked: Since the sepsis and consequent toxemia are largely due to the diminution of the bil-iary secretion, why not restore it? Our fathers relied on calomel, and by its help flooded the bowel with nature's own antiseptic. But there are *a priori* objec-tions to this. Nature sees fit to reduce to a mini-mum the action of the liver in all febrile diseases. We do not know the reason for this, any more than we knew the importance of the thyroid gland a dozen years ago; but it is the part of wisdom not to inter-fere with the course of nature unless it is unavoidable, and especially when we do not comprehend her proc-esses. Since we do not know why the activity of the liver is reduced during fever, we had best let it alone; but we know very well the effects of intestinal sepsis, and hence, we interfere to prevent them. Besides, the results of actual trial have shown that we can ac-complish our object far more effectually, safely and pleasantly by the exhibition of the sulphocarbolates than by the use of cholagogues.

As to the choice between the sulphocarbolates and other antiseptics, there is this to say: the sulphocar-bolates are extremely soluble. Bouchard prefers naph-thols on account of their comparative insolubility, be-lieving that soluble salts leave the intestinal canal too soon to render it aseptic in its entire course. But the action is strictly chemic, and he fails to inform us how a chemic antisepsis is to be secured without solution of the reagent. It appears probable that the good effects of the naphthols are really due to the small portion that is dissolved. Besides, in numer-ous instances, the limit of tolerance of the naphthols by the stomach is reached before the stools are rend-ered odorless.

Salol breaks up into salicylic and carbolic acids, and in full doses is apt to produce hemoglobinuria. The same objection holds good against all the carbolic derivatives, except the sulphocarbolates. I have given these salts to many persons and never saw nor heard of a case of hemoglobinuria. The iodic antiseptics occasionally cause iodism, even in small doses. Eczematous individuals especially appear to possess the power of setting free iodin from iodoform, europhen, etc. The biniodid of mercury has been strenuously advocated by Illingsworth, and the action of copper arsenite upon the duodenum demonstrated by Aulde, while mercury bichlorid has also its advocates. But the highly toxic character of these and similar antiseptics confines their use within narrow limits. The volatile oils, various chlorin preparations, sulphurous acid, hydrogen dioxid and potassium permanganate, are among the other antiseptics that have been urged for internal use; but the objections to all, for indiscriminate prescription, are obvious. It is, however, notable that good effects have been obtained from many agents of this class. The principle is of wider applicability than that of any agent in the group.

The sulphocarbolates labor under the disadvantages of being common and cheap—they cost about 60 cents a pound, as against a dollar an ounce for the proprietary articles; they can be prepared by any manufacturing chemist, and have no commercial interests to push them; and finally, they have no name great in the councils of medicine to back them up. Deprived of the potent support of printers' ink, they rest solely upon their merit, without puffing, and on this basis have won a place in the armamentaria of thousands of physicians to whom utility is the only incentive to the employment of medicine.

I have only spoken of the sulphocarbolate of zinc, but there are two other salts of this group that deserve notice. Sodium sulphocarbolate may be given in doses of 20 to 30 grains. The bodies of animals to which it has been given resist putrefaction for a long time. It has been recommended as a remedy for vomiting, for fermentative affections, and for pseudo-membranous diseases, with gangrene or necrosis, such as scarlatina and diphtheria. Several reports appeared some years ago as to its value in these affections. J. W. White pronounced it antacid, astringent, sedative, styptic, antiseptic and disinfectant. The sulphocarbolate of lime is also quite free from local irritant effects, and somewhat more antiseptic than the soda salt. Of the three, I prefer the zinc when a strong and certain effect is required, as in cholera infantum, typhoid fever, or marked intestinal sepsis; the soda sulphocarbolate, when the stomach is irritable, for milder forms of sepsis, or when an antacid is also indicated; the calcium sulphocarbolate for strumous or tubercular cases, or any other in which the reconstructive effects of lime are required, or where other lime-salts are indicated. These three sulphocarbolates have been combined in tablets, and for indeterminate cases these have fulfilled every requirement, being effective and non-irritant.

**Transplantation of Stenson's Duct.**—In a case of recurring fistula, Goris opened up the duct from its starting-point to its termination in the mouth, which he detached from all adherences, excising all the surrounding connective tissue. He then fastened it with a couple of stitches behind its natural location; endermic suture of the cutaneous incision. Recovery was prompt and by first intention.—*Presse Méd.*, September 3.

## INCOMPATIBLES.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7–10, 1898.

BY E. A. RUDDIMAN, PH.M., M.D.
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NASHVILLE, TENN.

To the practitioner, as well as to the patient and pharmacist, the prescription is an object of importance. Upon it the welfare of each one of these more or less depends. If it fails the mission of the physician and of the pharmacist fails. Heretofore, schools and colleges of medicine have not laid sufficient stress upon the combining of medicines. Within the last few years there has been a change for the better, and the graduates at the present time know more than did the graduates of a few years ago. However, even yet it is the exception rather than the rule to meet a young man who knows more than a little about writing prescriptions, and he may consider himself fortunate if he knows more than a little about the individual ingredients of the prescription. It is not his fault, but that of his professors, that he is not better prepared for this part of his work. The student, while in college, should be so thoroughly drilled in combining the best preparations in the best way that it will come naturally to him to write a correct prescription from the start.

The mere writing of a list of substances is not all that is necessary for a good prescription. In the first place, the physician must have diagnosed the case properly, and when he has determined what drugs will probably meet with the best success, he must choose what individual preparations will go together with the best result. It is in choosing the preparations that he so frequently fails. Let me illustrate with a single example. Suppose it is desirable to give tincture of chlorid of iron, strychnin sulphate, some preparation of arsenic and some preparation of cinchona, with the syrup of orange as a vehicle. Naturally the physician would choose Fowler's solution and a tincture of cinchona. In filling such a prescription there is danger of the alkali in the Fowler's solution precipitating the strychnin, the alkaloids in the cinchona and also the iron, and the ferric hydrate thus precipitated would combine with the arsenic to form an insoluble compound. And again, the tannin in the cinchona would combine with the iron, forming the black, inky, ferric tannate. In place of Fowler's solution the solution of arsenous acid should be used, it having the same physiologic effect and being of the same strength, but acid in reaction. In place of the tincture of cinchona there should be used quinin sulphate, or some such preparation as the National Formulary compound elixir of quinin, or the detannated tincture of cinchona.

In writing a prescription the physician must bring into use his knowledge of materia medica, therapeutic, physics, chemistry and pharmacy. No single one of these divisions will give him the requisite information; he must know therapeutics, in order to avoid physiologic incompatibility; he must know pharmacy and the physical properties of drugs in order to avoid pharmaceutic incompatibility; and he must know chemistry to avoid chemic incompatibility.

Perhaps the two great stumbling blocks to the physician in this line are pharmacy and chemistry. Without a knowledge of both he is at sea. His only

safeguard is to prescribe one or at most two substances together. This is no doubt desirable sometimes, although not always. I have had medical students ask me what good it will do them to spend so much time on these subjects. My answer has been to study assiduously now and they will know the use hereafter. That actual harm has sometimes come to patients from taking incompatible prescriptions is a fact beyond dispute, and we have the watchful pharmacist to thank that there are not more such cases. And even though no ill effect may result from an incompatible mixture, frequently no good comes from it, and we blame our books, the drugs, and the pharmacists for not getting the results that we expected, when our ignorance of pharmacy and chemistry is the cause. No doubt we have all had our nerves somewhat rudely shaken by being told that a pet combination of ours is rendered either dangerous or inert by chemic reaction.

A few general rules can be given in regard to what will form incompatible mixtures, but the majority of cases must be learned as isolated facts. These general rules are given in nearly every book on materia medica as fully as I could give them in such a paper as this. Many times we see the bare statement that two substances are incompatible, and to know this and nothing more is unsatisfactory and frequently useless. Because chemic reaction takes place, it does not necessarily follow that the mixture should not be prescribed, or that the products formed will not have a similar physiologic action. We should know what changes occur and what compounds are produced, otherwise how can we tell what the effects will be? Will the action of a mixture of spirit of nitrous ether and potassium iodid be the same as either or both taken separately? Or is the effect of an application of a mixture of lead water and laudanum similar to the effect of these preparations when applied separately? Are the effects of the green iso-nitroso-antipyrin what are wanted when antipyrin is prescribed with spirit of nitrous ether? Then let us not denounce the pharmacist as having worthless preparations, or accuse the physiologist of having made mistakes in regard to the actions of medicines, until we know that the failure is not due to incompatibility.

The number of incompatibilities is one which will increase rather than decrease with time. With the advent of nearly every new remedy the number is increased. Particularly is this true of the new synthetic compounds with which the country has been flooded for the past few years. Physiologic incompatibility does not occur in a prescription nearly as frequently as chemic or pharmaceutic. This is not because the physician has given this part of the subject more consideration, but due partly, at least, to the fact that he is not generally tempted to put into the same prescription remedies that are antagonistic.

To become convinced that the subject of incompatibility is one which has not received the attention which its importance demands, we have but to glance over the appended prescriptions, which are a few of those to be found in standard works on medicine and therapeutics. When our best authorities fall into such errors, it is not to be wondered at that the beginner should make many mistakes. Those of us who come in contact with students in medical colleges should give more instruction along this line. It is one of the weak points in the curriculum of many colleges. A neglect of this subject by a physician means a continual menace to the life of his patient.

℞ Collodii,
Spt. ammoniæ,
Tinct. iodi, āā part aeq.
Sig.—Paint over part with a camel's-hair brush.
—Potter's Mat. Med. and Ther., 6th ed., p. 716.

In this prescription the iodin is changed chiefly to ammonium iodid with a little ammonium iodate. Did the prescriber know this and did he wish to get the action of these instead of the action of iodin?

| | | | |
|---|---|---|---|
| ℞ Hydrarg. iodid viridis. . . . . | gr. | ¾ | 0485 |
| Potass. chlorat. . . . . | gr. | iij | 1943 |
| Potass. iodid. . . . . | gr. | ¾ | 0485 |
| Chocolate, q. s. | | | |

M.—Ft. in tabellum No. 1.
—Hare's System of Prac. and Ther., Vol. ii, p. 160.

In the presence of moisture the potasium iodid reacts with the mercurous iodid, causing the formation of metallic mercury and the much more active mercuric iodid (the red iodid of mercury). The potassium chlorate in the presence of a mineral acid, as the hydrochloric acid of the gastric juice, causes the iodin to be set free.

| | | | | |
|---|---|---|---|---|
| ℞ Hydrarg. chlor. corrosiv. . . . . | gr. | ss | | 0324 |
| Potassii iodidi. . . . . | ʒ | ss | 15 | 555 |
| Decocti cinchonæ. . . . . | fl ʒ | viij | 236 | 195 |

S.—Fl ʒj ter die post cibum.
—Farquharson's Ther. and Mat. Med., p. 334.

The potassium iodid combines with the corrosive sublimate and forms first the red iodid of mercury, and then combines with this to form the soluble double compound—potassium mercuric iodid. This double compound combines with the alkaloids of cinchona in the decoction and forms a precipitate. The danger in this prescription lies in the mercury being thrown out of solution. Did the physician realize that it is possible for the patient thus to take most of the mercury at one dose?

| | | | | |
|---|---|---|---|---|
| ℞ Sodii sulphitis . . . . . | ʒ | ij | 7 | 775 |
| Sp. ætheris. nit. . . . . | ʒ | ss | 15 | 555 |
| Liq. ammon. acet. . . . . | ʒ | iij | 93 | 309 |
| Aq. dist . . . . . | ʒ | ij | 62 | 206 |

Mix.—Sig. Teaspoonful every two hours.
—Hare, Vol. ii, p. 391.

The spirit of nitrous ether is decomposed, giving off the gas, nitric oxid, and part of the sodium sulphite is changed to sodium sulphate.

| | | | |
|---|---|---|---|
| ℞ Hydrargyri. . . . . | gr. | ⅛ | 008 |
| Iodini. . . . . | gr. | ½ | 0323 |
| Ac. tannici. . . . . | gr. | ⅗ | 0388 |
| Glycerini . . . . . | m. | xv | 0615 |

M. —Hare, Vol. ii, p. 125.

The iodin will change the mercury to mercuric iodid. The tannic acid will change part of the iodin, with the formation of hydriodic acid, which will further combine with the red iodid of mercury.

| | | | | |
|---|---|---|---|---|
| ℞ Tinct. ferri chloridi. . . . . | ʒ | ij | 7 | 775 |
| Acidi sulphurosi . . . . . | ʒ | j | 3 | 887 |
| Potas. chlorat. . . . . | ʒ | j | 3 | 887 |
| Glycerinæ . . . . . | ʒ | ss | 15 | 555 |
| Aq. calcis., q.s. ad . . . . . | ʒ | iij | 93 | 309 |

Misce. Dose: one teaspoonful every hour to two hours for a child of three years.
—Smith's Diseases of Children, 6th ed., p. 321.

On adding the sulphurous acid to the tincture of iron the mixture becomes of a much darker color at first and then nearly colorless. The glycerin may now be added and then the potassium chlorate dissolved in the water. There is barely a sufficient amount of water to dissolve the chlorate, and after

mixing with the ingredients some of the salt is thrown out of solution by the alcohol in the tincture. The possible reactions are as follows: 1, Between the ferric chlorid and sulphurous acid, forming ferric sulphite and hydrochloric acid; 2, the ferric sulphite thus formed changes to ferrous sulphate; 3, between the potassium chlorate and the hydrochloric acid in the tincture, forming chlorin; 4, between this chlorin and the ferrous sulphate, forming ferric sulphate and hydrochloric acid; 5, between the chlorin and the sulphurous acid, forming sulphuric and hydrochloric acids; 6, between the chlorin and the glycerin; 7, between the potassium chlorate and the sulphurous acid, forming potassium sulphate and hydrochloric acid; 8, between the ferric chlorid and the lime water, forming ferric hydrate and calcium chlorid; 9, between the sulphurous acid and the lime water, forming calcium sulphite.

Did the prescriber determine beforehand what products would be formed and that these were the compounds whose actions were wanted?

## GLANDULAR EXTRACT.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY ISAAC OTT, M.D.

PROFESSOR OF PHYSIOLOGY MEDICO-CHIRURGICAL COLLEGE, PHILADELPHIA.

EASTON, PA.

Glandular physiology in its widespread ramifications has revolutionized many parts of physiology and pathology. It is only in its infancy and its maze of metabolic changes holds many facts to be discovered. The secretion of the ductless glands opens up new avenues of investigation, which will enrich the science of physiology and the practical application of these facts in therapeutics. We have a silent and hitherto unsuspected secretion going on which plays a most important and unknown part in our economy. Very potent remedies are the ductless glands, where but a few thousandths of a grain of a gland like the pituitary greatly elevates the arterial tension. I have made over one hundred experiments upon the lower animals with the various extracts obtained from Armour & Co. of Chicago. The experiments upon the reflexes were made upon frogs, those on pulse pressure, respiration and temperature upon rabbits. The results were as follows:

*Adrenals.*—The adrenals caused an increase of reflex activity, which was as fugitive as the rise in arterial tension. It also depressed the pulse rate. The rise of blood-pressure was due to an action upon the walls of the artery. It decreased the rate of respiration.

*Pituitary.*—It depressed reflex activity for a short period; reduced the heart-beat and elevated arterial tension. This elevation was due to an action upon the arterial wall. The respiration rate was increased by it.

*Spleen.*—The spleen diminished reflex action. It also depressed the pulse and temporarily the arterial tension. Afterward the arterial tension increased. It had an unusual action in increasing the peristaltic movements of the intestine. The respiratory movements were also increased.

*Iodothyrin.*—It had no general action upon frogs. Upon the pulse-rate and arterial tension it had no marked effect, except a slight increase of pulse-rate at times. It increased the respiratory movements.

*Thyroid.*—In the frog it depresses the reflexes. It lowers the blood-pressure and heart-beat. It accelerates the respiratory movements.

*Pancreas.*—It decreased the pulse and arterial tension.

*Testicle.*—It lowered the pulse and slightly increased the arterial tension.

Upon the temperature nearly all these agents caused an elevation.

## THE WOUNDED OF THE PORTO RICAN CAMPAIGN.

BY N. SENN, LIEUT.-COL. U. S. V.

CHIEF OF THE OPERATING STAFF WITH THE ARMY IN THE FIELD.

The Cuban and Porto Rican invasions have confirmed the experience of the past in showing that the greatest horrors of war are caused by disease and its consequences rather than the implements of destruction. If the battle-grounds are in the extreme north or south, climate enters as an important factor in decimating the ranks and in increasing the sufferings of the contending armies. A war of invasion requires more preparation, foresight and forethought on the part of those who plan and conduct the campaign than one of defense, a fact we have been painfully made aware of during the last two months. The more remote the seat of conflict, the more difficult the task of providing food and clothing for the army, and the more serious becomes the problem of properly caring for the sick and wounded, and the greater becomes the difficulty in returning the survivors to their homes. Nostalgia, a very common affection among unseasoned troops, becomes more prevalent in proportion to the distance between home and the seat of war, as we had abundant opportunities to observe during the late war. The depressing effect of this common ailment has a decided influence in increasing the rate of mortality of the sick and wounded, and in impairing the effectiveness of the fighting line. Nostalgia is a contagious disease, not in the sense we use the word contagion ordinarily, but when once established in camp it increases rapidly by suggestion. The onset and spread of this common ailment of camp life are promoted by interruptions of the mail service, the only medium of communication between the soldier in the field and his distant home. Among the many sins of omission of those in charge of the management of the late war was a glaring neglect to provide for the much-needed and anxiously looked for mail facilities. If those who have the management of this branch of the government service in charge could be made to understand what an occasional letter will do in keeping up the spirit of the citizen soldier, nostalgia would have been less prevalent and its effects less disastrous during the late campaign. From the time I left Fortress Monroe for Cuba, July 3, and until I arrived in New York from Porto Rico, August 19, I received only two letters of the probable two hundred sent to me during this time. In summing up the casualties of the war just ended, it is safe to make the statement that the number of killed and the number of deaths resulting from the immediate effects of wounds will not exceed 280. The number of wounded will in all probability reach 1425. The number of deaths from malaria, dysentery, yellow fever and typhoid can not be estimated at this time, as those

diseases are still prevailing and will claim many victims before the troops are recalled. The loss of life and the suffering as well as disability, as a claim for pension, caused by disease and the effects of climate will exceed by far those caused by Spanish bullets. During the Porto Rican campaign no pitched battle was fought. The force of the enemy in all of the skirmishes was small and in ambush. Only a few were killed and not more than forty were wounded. Among the wounded, bone injuries were rare, many of the wounds slight. All of these cases tend to confirm previous observations to the effect that the small caliber bullet of the Mauser rifle, the one used exclusively by the Spaniards, causes wounds of the soft parts, which if left alone under the first dressing, will heal by primary intention in the course of a week or two, unless complicated by serious visceral injuries. All of these cases corroborate the statement previously made that the small caliber bullet does not infect the wound and that it seldom carries with it into the tissues clothing or other infectious substances. This observation, so abundantly supported by substantial facts, is an extremely important one for future field service, as it must satisfy the military surgeons that such wounds will heal promptly if left alone under the first-aid antiseptic dressing. On the other hand, I have seen the evil consequences following meddlesome surgery in the form of unnecessary probing. Such wounds are very susceptible to secondary infection caused by the use of the probe. For the purpose of again calling attention to the humane nature of the modern weapon, and with a view of showing how rapidly wounds inflicted with the small caliber bullet will heal under the most conservative treatment, I will report briefly the nature of the wounds and the results of those wounded in the Porto Rican war:

*Case 1.*—Lieut. J. C. Byron, Troop F, Eighth Cavalry, wounded in the skirmish near Mayaguez, August 10. The bullet passed through the foot from side to side on the dorsal aspect, making a groove on the upper surface of the second and third metatarsal bones without fracturing them. Healing by primary intention under the first dressing. He was in the saddle when injured.

*Case 2.*—Lieut. John Haines, Battery F, Third Artillery, was wounded in the attack on Aibonito, August 13, and is probably the last man shot by the Spaniards during the invasion of Porto Rico. He was in the advance of the line, with his battery planted on a high hill in full view of the enemy. After firing the number of shots ordered, the gun was turned, and at this moment a bullet struck him in the left lumbar region, postaxillary line, and escaped about the sixth intercostal space, anterior axillary line, on the same side. No indications of bone injury or penetration of the chest. The wounds were dressed in the field and healed by primary intention. He was conveyed in an ambulance from the front to Ponce, a distance of twenty miles, and transferred to the hospital ship *Relief*. At no time has he suffered much from pain or even a sense of discomfort which could be referred to the wound. The patient must have been in a stooping position the moment the injury was received.

*Case 3.*—Lieut. T. H. Hunter, Battery B, Fifth Artillery, was accidentally shot by one of his own men by a Krag-Jorgensen bullet, which entered the right side of the ilium, passed downward and backward, emerging from the gluteal region on the same side below the ramus of the ischium. The course of the bullet excluded bone injury in this case. Notwithstanding the length and depth of the tubular wound it healed rapidly by primary intention. The indications are that the patient will recover without any functional impairment of the parts implicated in the injury.

*Case 4.*—William H. Walcutt, Company E, Fourth Ohio Infantry, was wounded in the skirmish near Guayamo, August 8. The bullet entered the plantar surface of the left foot between the first and second metatarsal bones, at the junction of the middle with the distal thirds, and escaped from the dorsal side at a point a little nearer the distal side. From the course of the bullet it is clear that he was running in a direction opposite to the enemy when the shot was fired. The wounds were healed a week after the injury was received.

*Case 5.*—William J. Edgington, Company A, Fourth Ohio Infantry, was wounded during an engagement, August 8. The wound of entrance was at a point two inches to the left of the median line on a level with the sacro-coccygeal joint, the wound of exit at the base of the opposite thigh over its inner and middle aspect, directly over the adductor muscles. No evidence of any serious visceral injury of any of the pelvic organs. The temperature remained normal, the wounds healed by primary intention, and when I examined the patient in the hospital at Guayamo, five days after the injury was inflicted, the patient was free from pain and able to leave his cot without assistance. The course of this bullet explains the position of the patient at the time the bullet reached its unwilling, moving mark.

*Case 6.*—Noble W. Horlocker, Company C, Fourth Ohio Infantry, was wounded in the same skirmish. The bullet entered one inch in front of the right malleolus and escaped two and three-fourth inches below and a little behind the external malleolus. Although the bullet must have passed through the ankle joint and the astragalus, the injury was followed by very little pain, except on moving the ankle joint, and no indication of infection had set in five days after the injury was received. It is reasonable to expect that the wounds will heal by primary intention, and that the patient will recover with a useful, movable ankle joint.

*Case 7.*—Stewart J. Mercer, Company E, Fourth Ohio Infantry, was wounded August 5, in a skirmish on the way from Arroya to Guayamo. The bullet made a flesh wound over the inner margin of the left patella, and healed by primary intention in a few days.

*Case 8.*—Samuel T. Jones, Company C, Fourth Ohio Infantry, received a wound above the right patella, August 8. Wounds of entrance and exit one inch apart. Primary healing under the first dressing.

*Case 9.*—Edward O. Thompson, Corporal Company K, Fourth Ohio Infantry, was wounded near Guayamo, August 8. The bullet entered the forearm two-thirds of an inch above the wrist joint, on radial side, and after passing through the soft tissue in front of the bones, emerged from the inner aspect of the forearm just above the wrist joint. Wound healed by primary intention under the first dressing.

*Case 10.*—Harry Lee Haynes, Company C, Fourth Ohio Infantry, was lying down in a ditch at the time he was wounded, August 8. The bullet struck the arm two inches above the insertion of the deltoid muscle and emerged over the sterno-clavicular articulation on the same side. A third wound was found on a line with the course of the emerging bullet one inch below the mastoid process and in the direction of the sterno cleido-mastoid muscle. A fourth wound, an inch and a half in length, one-quarter of an inch in depth and an inch in width, was found on the dorsum of the right forearm an inch above the elbow joint. All the wounds healed rapidly, caused but little suffering, and the patient was in a fair way to recovery when seen a few days after he was wounded.

*Case 11.*—Clarence W. Riffer, Company A, Fourth Ohio Infantry, was wounded August 8. The bullet entered the right thigh at a point five inches above the knee joint and about the middle of the external surface, passed through the soft tissues making its exit three inches to the left of the point of entrance. It re-entered the left thigh at a point two and a half inches above the knee joint, and an inch and a-half to the right of the posterior median line and emerged on the oposite side an inch and a-half above the knee joint. Both flesh wounds deep and long as they were healed primarily without suppuration.

*Case 12.*—John O. Cordner, Company C, Fourth Ohio Infantry, was wounded August 5. The bullet made a flesh wound at the lower border of the patella, the wounds of entrance and exit being separated by a space an inch and a half in length. Primary healing under first dressing.

*Case 13.*—William Rossiter, Company G, Eleventh U. S. Infantry, was wounded in the skirmish near Mayaguez, August 10. He was shot through the inferior maxilla. The bullet entered just below the margin of the bone on the right side about an inch in front of the angle and emerged over the angle of the bone on the opposite side, perforating the soft tissues of the neck in a transverse direction. The bullet appears to have passed through the bone without fracturing it. The only pain the patient complains of is produced when he undertakes to masticate food. Wounds of entrance and exit healed in a few days by primary intention.

*Case 14.*—Amos Wilkie, Eleventh U. S. Infantry, was on the march when wounded near Mayaguez, August 10. The bullet entered the right lumbar region just above the crest of the

ilium, mid-axillary line, and emerged about two inches to the left of the spine and four inches above the left sacro-iliac synchondrosis. No indications of intra-abdominal complications. He suffered considerable from cramping pains, which he attributes to cold and fever which he contracted by exposure to rain. A week after the injury was received, when the patient was an inmate of the Hospital Ship *Relief*, his condition warranted the hope of an early and complete recovery.

*Case 15.*—Harry C. Errick, Company C, Eleventh U. S. Infantry, was wounded August 10, in a charge on the enemy in ambush. Wound of entrance in left leg over the outer aspect of the middle third; the bullet passed downward and inward and emerged about five inches above the inner malleolus. Hemorrhage slight, no fracture. Wound healing rapidly under first dressing.

*Case 16.*—William H. Wheeler, Company A, Eleventh U. S. Infantry, was wounded August 10, near Mayaguez, when in a standing position with his side in the direction of the enemy, his gun down, ready to reload. The bullet struck the tenth intercostal space, left side, in the post-axillary line and made its exit about four inches from the spine in the lumbar region close to the margin of the last rib. No serious complications followed the injury, and at the present time, August 14, the patient is improving rapidly.

*Case 17.*—George Curtis, Company D, Light Battery, Fifth Artillery, received a wound of the chest August 10, being in his saddle at the time. The bullet passed through the chest from the second left intercostal space in front to the middle of the outer border of the scapula on the same side. No hemoptysis or any other serious symptoms indicating the existence of the visceral wound of the lung. The only thing he complains of is a sense of numbness in the left arm. Primary union of both wounds.

*Case 18.*—Joseph P. Ryan, Corporal Company A, Eleventh U. S. Infantry, was wounded August 10. The bullet passed through the ankle joint. Wound of entrance over the internal malleolus of left leg, wound of exit two inches below the outer malleolus. No infection or signs of synovitis. Wounds healing by primary intention.

*Case 19.*—Samuel Copp, Company A, Eleventh U. S. Infantry, received a scalp wound, August 10, while he was lying on his abdomen on the summit of a hill. Wounds of entrance and exit about two inches apart, healed under the first dressing. He is suffering from a contusion of his abdomen he sustained by falling over an embankment during the same skirmish.

*Case 20.*—Arthur Sparks, Company C, Eleventh U. S. Infantry, received a wound of the lower third of the left thigh, August 10. Wound of entrance on external anterior aspect of thigh about five inches above patella. The bullet passed directly backward and came out on the opposite side on the same level without injuring the femur. Healing by primary intention.

*Case 21.*—George W. Whitlock, Company C, Sixteenth Pennsylvania Infantry, was in a kneeling position when wounded near Guayamo, August 9. The bullet entered the thigh near the perineum, over the adductor magnus muscle, passed in an outward and backward course and emerged from the gluteal region near or over the sciatic foramen. Hemorrhage slight. Paralysis of the foot and lower part of the leg points to injury of the sciatic nerve. Healing of wound without complications.

*Case 22.*—James Drummond, Company K, Sixteenth Massachusetts Infantry, was wounded near Guayamo, August 9. The bullet entered the neck on the left side, behind the sterno-cleido-mastoid muscle, two inches below the mastoid process. Wound of exit on the opposite side in front of the trapezius muscle. No immediate or remote complications. Wound healed by primary intention. Patient has suffered from slight attack of malarial fever.

*Case 23.*—Paul J. Mytzkie, Company D, Eleventh U. S. Infantry, was wounded in the skirmish near Mayaguez, August 10. The bullet made a flesh wound three inches above the external malleolus, which healed in a few days by primary intention under the first dressing.

*Case 24.*—Daniel J. Graves, Company M, Eleventh U. S. Infantry, received a gunshot wound of the thigh near Mayaguez, August 10. The bullet passed through the thigh in an antero posterior direction, fracturing the femur at the junction of the middle with the lower third. A week after the injury the patient was in excellent condition, the wounds remaining aseptic and healing rapidly.

*Case 25.*—Theodore H. Newbold, Company I, Sixteenth Pennsylvania Infantry, was shot while retreating during the skirmish near Guayamo, August 9. The bullet entered the right arm above the olecranon process and emerged from the extensor side of the forearm between the radius and the ulna. The olecranon process was broken off. The X-ray reveals the presence of a fragment of the bullet, or its mantel, lodged in the wound. Aseptic healing of the wound.

*Case 26.*—Clyde C. Frank, Company C, Sixteenth Pennsylvania Infantry, was injured near Guayamo, August 9. The bullet entered the inner surface of the middle of the right thigh, passed upward and backward, and in grazing the femur made a groove without fracturing the bone, emerging from the external and posterior aspect of the thigh. Both wounds healed by primary intention. In making a skiagraphic examination of the seat of injury a fragment of the bullet was discovered in the groove. The piece of lead, as well as a few loose fragments of bone, were removed August 17 by enlarging the wounds of entrance and exit. Operation by Dr. Shultze.

*Case 27.*—John L. Johnson, Company D, Eleventh U. S. Infantry, received a gunshot injury near Mayaguez, August 10. The bullet passed in an antero posterior direction through the middle third of the left leg, going through the space between the tibia and fibula. Hemorrhage slight. Healing by primary intention.

*Case 28.*—Samuel G. Frye, Company D, Fifth Artillery, was injured by a deflected bullet, as he stood by his cannon, near Mayaguez, August 10. The bullet passed through the soft tissues in the right anterior axillary fold without doing any further damage. The wound healed by primary intention.

*Case 29.*—Henry Gerrick, Company E, Eleventh U. S. Infantry, received a superficial wound over the pronator muscles, near Mayaguez, August 10. The wound healed promptly by granulation.

*Case 30.*—John Browning, Corporal, Battery D, Fifth Artillery, was wounded near Mayaguez, August 10. The bullet passed transversely through the soft tissues of the right forearm on a level with the wrist, in front of the radius and ulna. The bullet evidently cut the ulnar nerve and vein, as shown by the paralysis of the parts supplied by the nerve below the seat of the wound and the free venous hemorrhage which immediately followed the injury. Healing by primary intention.

The marked contrast in the results of the treatment of the wounded in Cuba and Porto Rico, I attribute entirely to the better preparations made for the last invasion, and not to any difference in the surgical skill of the medical officers. The surgeons engaged in the Cuban war were men exceptionally well prepared for their profession, and performed their onerous task with energy and enthusiasm. Ambulances were scarce, the fighting line far away from the base hospital, conditions which made it difficult to render timely and efficient first aid. Another circumstance which had its influence in interfering with the prompt and effective first aid to the wounded in Cuba was the large number of men who fell in battle in three days. The war in Cuba precipitated in a pitched battle; in Porto Rico it consisted in a number of skirmishes in which only a small number needed surgical attention. In Porto Rico the rear of the different armies was supplied with an adequate number of ambulances and Hospital Corps men. The first aid was rendered almost immediately after the wounds were received, after which the patients were conveyed to the hospital at once. A sufficient number of medical officers were on hand during each engagement to take immediate and proper care of the wounded. In most instances the wounds healed by primary intention under the first dressing. The value and importance of early surgical attention, and the first-aid dressing, became apparent in comparing the condition of the wounds, a week after the injuries were received, during the Cuban and Porto Rican campaigns.

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**Carcinoma of the Esophagus.**—Carcinoma of the esophagus can remain latent, that is, not cause any difficulty in swallowing nor in the passage of a sound, until death, if it extends lengthwise and does not invade the entire circumference. Leichtenstein recently exhibited a number of preparations to the Cologne Medical Association in which a narrow, elastic groove had remained free from carcinomatous invasion to the last, allowing the ingestion of food, although the carcinoma had extended 9 cm. perpendicularly.—*Munich Med. Woch.*

# COLPOPERINEORRHAPHY AND THE STRUCTURES INVOLVED.

DEDICATED TO DR. THOMAS ADDIS EMMET AND MR. LAWSON TAIT IN RECOGNITION OF THEIR LABORS IN THE SURGERY OF THE PERINEUM.

BY BYRON ROBINSON, B.S., M.D.
CHICAGO, ILL.

*Continued from page 860.*

The second step of the operation is to introduce the sutures of silkworm gut. The two fingers are removed from the rectum and well cleaned. The point of the handled needle is introduced at the upper angle of the wound (No. 2 in Fig. 21) without penetrating the skin or vaginal mucous membrane, carried along about one-half inch from the distal edge of the vaginal flap and made to emerge at the median raphe. It is then threaded and drawn out. The point of the needle is again introduced at the upper angle of the wound on the opposite side (No. 4 in Fig. 21), forced along the distal edge of the flap about one-half inch

Fig. 38.—(Author.) A stage in progress of the flap-forming colpoperineorrhaphy. Here the sutures appear as if the process had started at the anus, but the safest and most practical method is to begin to introduce sutures and tie from the anterior end. All sutures are threaded in the median line. The needle may be thrust across the entire denuded field, but one can make more perfect and deeper suturing by doing one-half at a time.

from the edge and made to emerge again on the median line. It is threaded and drawn out. This constitutes the first suture. Generally three anterior sutures are introduced in the above manner. To introduce the posterior sutures (three or four) the index finger should be placed in the rectum as a guide, to avoid passing the needle too close to the rectal mucosa, endangering fistula. The fistula may arise quickly or slowly. If quickly an abscess will arise; if slowly (two to four weeks) a fistula will arise and remain a longer or shorter time. In one case a fistula persisted for three years. The posterior sutures are introduced similar to the anterior. However, they should be deeper and should thoroughly include the levator ani fascia superior and inferior with the enclosed levator ani muscle. The point of the needle is passed into the edge of the wound, avoiding the skin, and pushed onward to the median line, where the point emerges, is threaded and drawn out. It is again introduced on the opposite side and threaded in the middle. In all cases requiring extensive dissection the needle should be passed through half of the wound only. In the less extensive part of the wound the needle may pass through the whole wound at once. Mr. Tait employed three to five sutures. We employ five to seven sutures.

The third step is to tie the sutures of silkworm gut. All the sutures are seized at the distal end by the left hand while the right hand pushes the tissues of the wound as far toward the loop of the sutures as possible. This is a partial step, as it narrows and puckers the wound very much, so that when each individual suture is tied it assumes its final location. The sutures should not be tied too tight, as they are apt to cut through considerable tissue. After the sutures are tied, a linear gap of considerable width will exist in the median line, for the sutures do not penetrate the skin, and hence will not draw it in close coaptation. Here some of the inexperienced will be

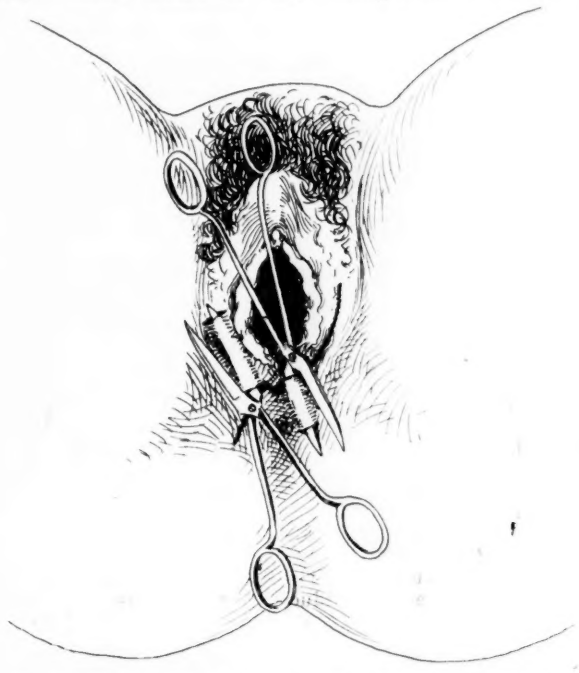

Fig. 39.—(Robinson-Holland.) Method of formation of anterior and posterior flaps in the flap method of executing colpoperineorrhaphy.

tempted to place a few skin sutures to avoid the gaping of the wound. Be sure not to do it, for they cause pain and may produce an abscess; when the legs are placed together the edges of the wound will coapt. The ends of the sutures should be left long and all tied into a single bundle. The after-treatment consists in applying no dressing or chemicals to the wound. If there be considerable pain small hypodermic doses of morphin may be used for thirty-six hours. Most patients will require catheterizing, from trauma to the distal ends of the pubic nerves. After forty-eight hours we begin to give two quarts of a vaginal douche, evening and morning. The bowels should be moved on the third or fourth day by means of calomel given in small doses (1 grain two or three times) and followed by teaspoonful doses of $MgSO_4$. Diet should be regulated and limited for three days before and three days subsequent to the operation. The patient should lie in bed for at least two weeks, and afterward get up as she is able. The sutures

should be watched. If one becomes loose it should be removed. If none become loose or separate they may remain for three, four or even six weeks. Three weeks is soon enough to remove the sutures. The wound heals more firmly with the sutures in for four weeks or more. The sutures act like splints, holding the surfaces in fixed coaptation, avoiding motion, which interferes with perfect union. The sutures often give pain on removing, and it would perhaps be better in some neurotic cases to anesthetize the patient. However, I never practise it. Amateurs must be warned not to close the vulva unnaturally tight as it might disturb marital relations. The cuts in the article will show the steps in the technique.

### THE EMMET OPERATION.

This operation is in marked contrast to all previous ones for similar purposes, as union of the denuded labia was the first procedure. The peculiarity of Emmet's operation consists in denudation of the lower median posterior vaginal wall; bilateral denudation of triangular portions of the lateral sulci of the vagina; in the method of introducing the sutures, which are so arranged that on tying they lift the prolapsing parts toward the pubic arch, restoring anatomic structures, as the H-shape to the vagina and the normal curve of the vagina. The patient should be prepared for several days by cathartics and daily skin baths. The bowels should be evacuated by eight to twelve passages, so that no feces will be in the rectum while operating, nor for 24 to 36 hours after. Thorough salt-rubbing of the skin not only stimulates the apparatus of the skin to the climax of secretion but reflexly stimulates the bowels and kidneys to active secretion. In short, place all secretory organs—skin, bowel and kidney—at their maximum activity for the operation. Place the anesthetized patient on the back, with an assistant holding each limb. With tenacula fixed to definite points of the vagina, as for example, one at the median crest of the rectocele, one tenaculum on each side of the vagina at the highest point of the triangle of denudation in the sulci and one on each side of the posterior vaginal wall at the junction with the skin and mucosa, one can mark the outline of the denudation with a scalpel. It is well, before denudation, to test whether the area is too large to insure coaptation of the wound without undue tension. The area defined by the tenacula is denuded by the operator cutting off long strips of vaginal mucosa with scissors curved on the flat. Others denude with the scalpel, rolling the denuded vaginal flap on a staff or on the fingers. With experience, large areas may be rapidly denuded. The area requiring denudation in the lateral sulci depends on the amount of slack in the posterior vaginal wall, for this operation has the special merit of narrowing the vaginal canal. With a typically relaxed vaginal outlet a large area of denudation will be required, and especially high in the right and left vaginal walls. The denudation should consist of the whole thickness of the vaginal wall. Continuous hot water irrigation over the denuded surface will check the hemorrhage. The operation is eminently a posterior colporrhaphy, and the success will depend on denudation in the lateral vaginal sulci, and not on the denudation of the so-called perineum. In case the vaginal wall is very slack and thin it is well to extend the denudation deep into the bilateral subvaginal tissue in the vaginal sulci. Perfect denudation is a requisite; no islands of vaginal mucosa must be left. The second step of the operation, equally important with denudation, is the plan of introducing the sutures. The object of the special planning of the sutures is to lift the lax vaginal outlet upward toward the pubic arch, restoring the vaginal condition. The skill in planning the denudation in the right and left sulci of the vagina is no less than that employed in the introduction of the well-devised plan of sutures. The chief materials for sutures are silver wire, silkworm gut, and catgut. To suture the denuded surface expose one of the triangles in the lateral vaginal wall. Begin to suture at its apex, passing the suture transversely across the angle, after which immediately tie it. The second suture is passed one-quarter of an inch from the first (four sutures to the inch). The needle is passed through the vaginal wall and subvaginal tissue toward the operator (in an anterior posterior direction), whence it emerges, and is re-entered at the same point and passed in an antero-posterior direction under the subvaginal tissue through the denuded triangle, emerging on the vaginal mucosa at the edge of the wound. This makes the suture, before tying, represent a tri-

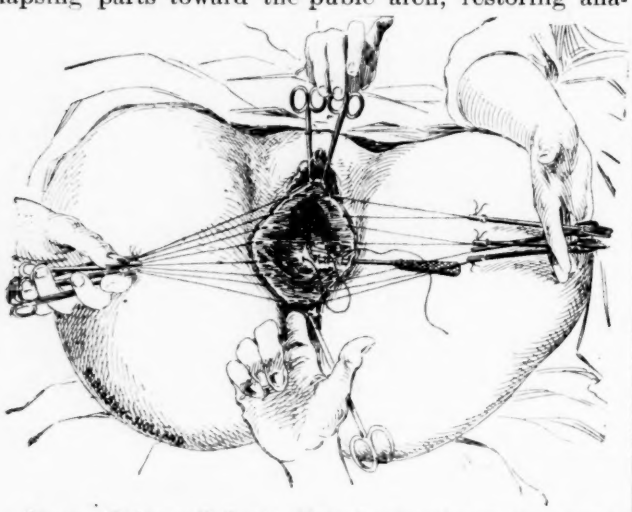

Fig. 40.—(Robinson-Holland.) Method of introducing the sutures in the flap method of colpoperineorrhaphy. Note that the handled needle is threaded in the median line. This cut was drawn from a photograph taken of a patient during the operation.

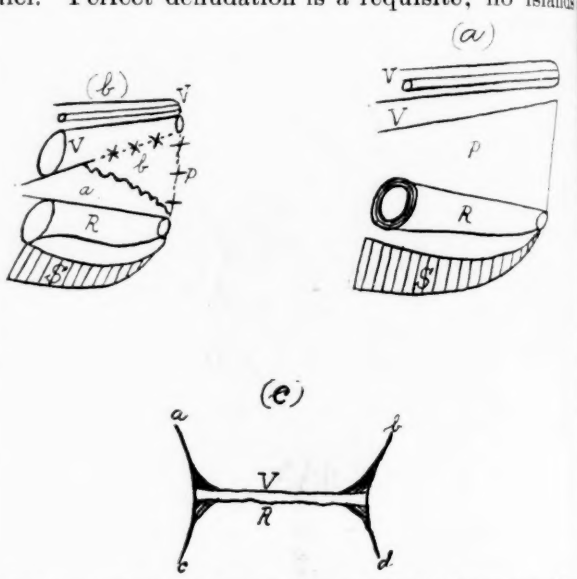


Fig. 41.—(Author.) Diagram of the plan of Tait's flap colpoperineorrhaphy: *a*, S, sacrum; R, rectum; P, intact perineal body; V, vagina, with urethra above it; *b*, has had the torn perineal body, P, repaired by the six sutures marked by stars; *c*, shows the H-shaped anterior cuts, *a*, *b*; *c*, *d*, the posterior cuts; R, rectum; V, vagina.

angle, with its apex (at the emerged points of the suture in the denuded triangle) toward the operator, and characterizes the plan of suturing; i. e., they are introduced in an antero-posterior direction, and by tying, they lift the vaginal outlet toward the pubic arch. The next suture is introduced by passing the needle through the vaginal wall (on the internal side of the triangle) deep into the subvaginal tissue of the denuded triangle (directly toward the operator), whence it emerges, and is re-entered at the same point and carried upward and outward (away from the operator) very deeply under the denuded area, emerging on the vaginal mucosa at the external side of the triangle. The sutures on the external side of the denuded triangle should be especially deep and should include extensive tissue. Generally three or four sutures are sufficient to close the triangle of each sulcus. The suture at the base of each triangle may be called a tension suture. It can be tied as soon as

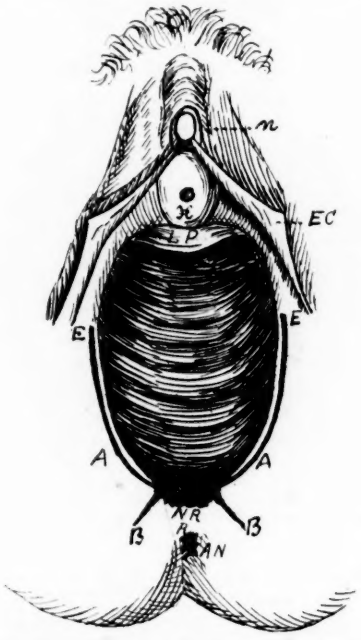


Fig. 42.—The outlines of the anterior "cuts," (A, E,) and posterior "cuts" (A, B,) in the flap colpoperineorrhaphy. *n*, Clitoris; *h*, urethra; L. P. anterior vaginal wall; A, N, anus; N, R, perineum; E, C, labia. The vaginal orifice is wide open. The laceration is not complete, *i.e.*, it does not reach the rectum,

passed, which will enable more superficial sutures to be applied to the upper part of the triangle. The crown or pursing suture is now passed within the vagina by introducing the needle in the mucosa on the lateral vaginal wall close to the incision, a short distance below the center of the triangle. The needle should emerge in the subvaginal tissue in the sulcus below the point of introduction. The needle is re-entered and carried across the vaginal sulcus just below the vaginal incision, emerging at the opposite side. One or two auxiliary pursing sutures are added and the several sutures tied; superficial sutures are then added, as required, to close the gaps in the wound. The deep sutures should be of silkworm gut and the superficials of catgut.

In this essay it is not the purpose to discuss immediate repair after labor, but the views are directed toward chronic damage of the vulva, vagina and pelvic floor. It will require careful examination of the vulva, vagina and uterus to decide in certain cases what will be the wisest plan to pursue. Some cases show extensive laceration with but few symptoms, while others show little damage, but complain of severe suffering. Such differences rest on visible and invisible supports. Extensive perineal lacerations demand repair whether they create symptoms or not, as such lesions will in all probability lead to illness. One may occasionally meet a patient who has had a perineal operation, and the perineum to all intents and purposes appears normal; yet an examination reveals the fact of a rectocele above the restored perineal body, and the patient confirms the results of the examination by still announcing herself as suffering. In operating, the dissection of the so-called perineal body should extend as high on the recto-vaginal septum as there appears redundancy of the posterior vaginal wall (rectocele). Nothing less will cure the patient. The perineal body, in its broadest

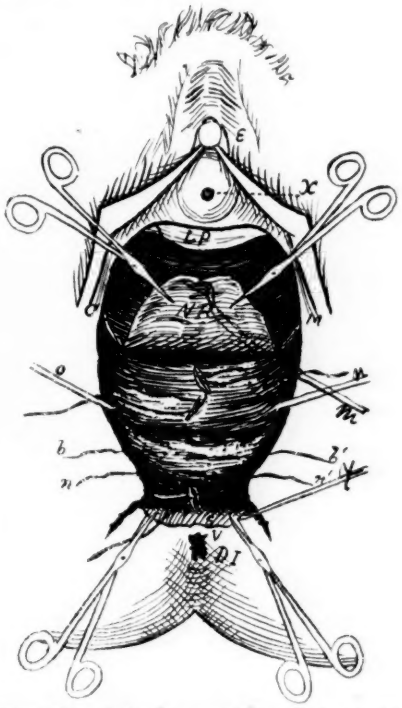


Fig. 43.—Dissection of the flap and the anterior vaginal wall. N, R, drawn up with forceps. The posterior flap, S, is drawn backward by forceps, two sutures, *b*, *n*, are already passed; three more sutures, one being introduced by passing the curved-handled needle from the lateral edge of the wound to the middle of the denuded surface and threading it from the median line with silkworm gut; D, I, anus; V, perineum; E, clitoris; X, urethra; L, P, anterior vaginal wall.

sense, is a resistant ligamentous, fibromuscular structure which closes the abdominal cavity below. The body begins to be supported from the curved white line located on each side of the pelvis, as one may be impressed by looking into a pelvis from above. It is bowl-shaped, and as soon as this peculiar shape becomes lost, the supports have given away at some point. Observed from below the perineum is narrowed to the space between rectum and vagina. The flap operation is capable of repairing any defect in the pelvic floor. In complete laceration the anal and vulvar orifices are in direct communication, like a cloaca. The rectovaginal septum may show a boot-jack angle or an irregular arched outline. The irregularly-torn outline of the rectovaginal septum shows a double-walled layer or curved sides. At the upper angle of the lacerated rectovaginal septum the rectal mucosa pouts, rolls and appears as a red or pink ground which aids in locating the line to split the flaps.

After the rectovaginal septum has been lacerated

for a long time it presents irregular cicatricial bands, some of which are thin, others thick, assuring different stages of atrophy and contraction. Bridges or bands of tissue may stretch from one point to another showing a penetrated condition. Again, the lower edges of the lacerated rectovaginal septum may be drawn upward by the fibers of the levator ani still embracing the parts by the aid of its double fascial sheets. Besides small, irregular depressions may be felt or observed where the stump of a bundle of the levator muscles has been torn away and retracted. The deep sutures applied after splitting the septum will include these stump ends of the muscles by means of fascia so that they may be again forced to the median raphe and fixed there. The flap operation does not need to observe whether the sphincter, anus or rectovaginal septum be lacerated, for it is alike applicable to each and all. On examination we may find all kinds of associated conditions with extensive colpoperineal lacerations, as lacerated cervix, subinvolution of the vagina, cystocele, rectocele, and retro-

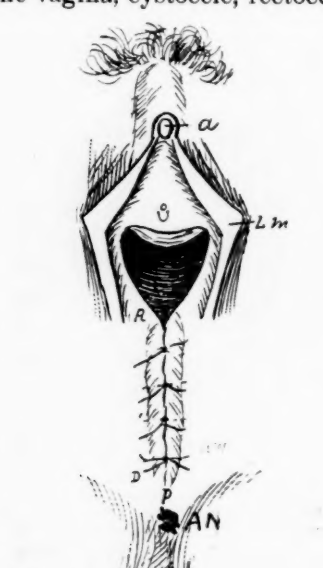


Fig. 44.—Sutures tied in the operation for colpoperineorrhaphy with incomplete laceration. A, N, anus; L, M, labia; A, clitoris; V, urethra; R, D, median line of the perineal raphe; P, posterior point of perineal space.

version of the uterus. Now if the uterine appendages are freely movable we can generally cure the patient by curettement, repair of the cervix and colpoperineorrhaphy, for much of the disease observed is due to disturbed circulation. The vessels have been torn from their supporting bed by the deranged fascia. The veins have become straightened out, dilated locally, and have lost their elegant spiral form, resulting in blood stasis, congestion. Restore the supports and circulation will resume.

The diagnosis consists of observation and palpation with the aid of a large Sims speculum. In the diagnosis a notably striking feature is the changed appearance of the vulvar outlet. Normally the perineum is widest at its upper end. With lacerated perineum or relaxed vulva the whole external appearance is changed. The narrow puckered chink or slit-like aperture of the natural vulvar orifice is transformed into a patulous gaping. Again, the normal vagina presents a sigmoid curve with the posterior vaginal wall coapting and embracing the anterior, like a valve. But in deficient vaginal apparatus these two concentric coapted curves have lost their relations, especially the posterior vaginal curve. It should be remembered, in diagnosing this deficiency at the vulva, that the non-closure is not due especially to loss of the perineal body, but to defect in the levator ani muscle and its double fascial layers. The levator ani muscle endows the rectum with its anterior curve and drags the lower end of the vagina upward and forward against the pubic arch. This fact can be demonstrated by introducing the finger into the vagina and forcing backward and downward, when by removing the finger, the vagina quickly returns to its normal position. The vaginal orifice has no distinct sphincter like the mouth or anus, but has an indirect sphincter, the horseshoe loop of the levator ani, aided by the pubic arch. The arch acts like a fixed point and the vagina is indirectly closed by shortening, contracting of the anterior bundle of the levator ani

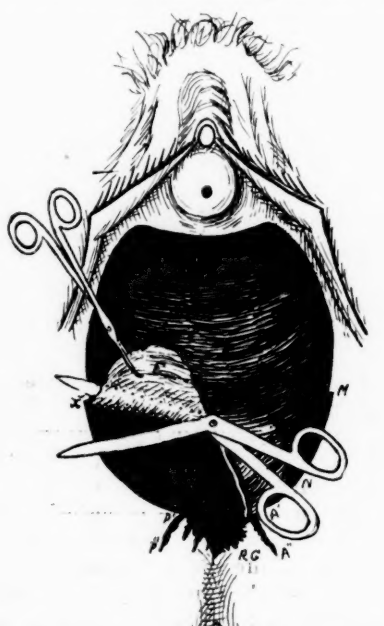


Fig. 45.—Flap formation in a case of complete laceration of the recto-vaginal septum into the rectum. The scissor blade is splitting the vaginal from the rectal wall to form the flap, F, whose margin comes from the mucocutaneous line X, P; P, P, is the back cut; A to A, the opposite back cut; A, M, the anterior scissor clip.

muscle. The vagina is closed by flattening its walls antero-posteriorly between the rectum and pubic arch. It is H-shaped. There is a slight puckering of the vagina at its external orifice by means of the weak bulbo-cavernosus muscle, but practically this amounts to nothing in physiology and anatomy. On account of the position of the rectum in relation to the levator muscle it produces a sigmoid curve to the rectum, with its convexity forward. This is due to the fact that the strongest bundles of the levator muscle encircle the rectum about an inch above its orifice or lower end, whence by contraction it yields at the point of greatest force, i. e., at the sigmoid bend. On account of the position of the vagina, levator ani and pubic arch, the lower end of the vagina is dragged upward, producing its sigmoid curve forward, in the opposite direction to that of the rectum. In other words, the plane of the pubic arch is anterior to the plane of the levator ani muscle, and when it contracts it must necessarily drag the lower end of the vagina upward and forward. These considerations may be appreciated by introducing the finger into the vagina and the

thumb into the rectum. It is best studied first on a multipara and second on a nullipara, and third on one with a deficient vaginal sphincter apparatus. The closure of the vagina well forward toward the pubic arch produces a kind of valve, which acts almost as a certainty against prolapse while intact. This is one of the elements of success in both the Emmet and Tait perineal operations. The vast difference in appearance between the virgin and the relaxed vaginal sphincter apparatus of the multipara is due to the yielding of supports by the process of labor in nearly all cases (visceral ptosis excepted). This does not appear so strange when we consider that the virginal passage of the vagina is about an inch in diameter, while the passing head, shoulders and breech demand ten to twelve inches in diameter. It is not strange that tissues forced to stretch from one to twelve inches should forget to return. The levator ani muscle is arranged in fasciculi or bundles, or it would become defective more frequently. The sphincter and vaginal apparatus may be injured by external accidental trauma, but labor is the chief factor.

*(To be continued.)*

# SOCIETY PROCEEDINGS.

## American Public Health Association.

*Twenty-sixth Annual Meeting, held in Ottawa, Ontario, Sept. 27-30, 1898.*

The American Public Health Association for the third time in its history met in the Dominion of Canada, this being the twenty-sixth meeting since its organization in 1872. It was feared that the prior quarter-centennial jubilee of the State Board of Health of Michigan and the coincident meeting of the Conference of State Boards of Health at Detroit in August, and the unfortunate announcement of the meeting of the Illinois Auxiliary Sanitary Association at Chicago on the same date as had been months before published as having been selected by the executive committee for this twenty-sixth annual meeting, would affect the attendance, but this did not prove to be the case, the number of old members present, having a record of fifteen to twenty or more years of service, being particularly noticeable. The Mexican and Canadian members were as earnest and conspicuous in their participation in the work of the Association as they have ever been since they became constituent parts of the organization, their papers being of that high order which habitually characterizes the contributors to the transactions. It was a matter of comment that six of the former presidents were present, three others having been prevented from coming by unavoidable official duties. This attendance of so many ex-presidents is especially gratifying, since it shows the wisdom of the provision of the constitution of this Association making them ex-officio members of the executive committee, thus securing that uniformity and persistence of policy which are so apt to be influenced in a body changing its locality and officers from year to year. About seventy-five new members were added to the rolls, an unusual proportion of these, as well as of the contributors of papers, being non-medical men interested in sanitary matters. The character of the papers was far above the ordinary, many of them, in the shape of exhaustive committee reports, precluding any satisfactory abstract or epitomizing, without injustice to the writers and reporters. This, however, is less necessary since the executive committee, at its preliminary meeting on Monday afternoon, had unanimously resolved to abandon the quarterly form of publication of the transactions and revert to the annual volume, which had been formerly issued, the publication committee having announced its intention to have the transactions of the current meeting in print and distributed within two months after adjournment.

### Tuesday, September 27—Morning Session.

The routine sessions of the Association were held at the Parliament Buildings, where, at 11:30 A.M., Tuesday, September 27, the Association was called to order by the President, Prof. Charles A. Lindsley, of Yale University, Secretary of the State Board of Health of Connecticut, who introduced the Chairman of the Local Committee of Arrangements, Dr. John Sweetland, Sheriff of Ottawa, by whom the customary announcement of proposed entertainments, etc., was made.

The carefully prepared minutes of the preceding meeting at Philadelphia in 1897, were then presented by the Secretary, Dr. Charles O. Probst, secretary of the State Board of Health of Ohio, but having been already published in the quarterly transactions, they were affirmed without reading.

The Secretary then read the report of the executive committee, always a matter of the greatest interest in this body, which while conferring extraordinary powers upon the committee in the matter of the revision and amendment of resolutions, the digestion of propositions, the suggestion of courses of procedure, etc., jealously exercises its own prerogative of final approval or veto.

1. With respect to the resolutions offered at the preceding meeting by Mr. Henry Lomb of Rochester, N. Y., contemplating the publication of journal appeals on the part of the Association to State, municipal and town corporations, and the widespread distribution to the public, through the newspapers of this appeal, urging the necessity for the establishment of local sanitary organizations, the committee reported that it was of opinion that the measures for the enforcement of regulations designed to prevent the spread of disease could be best advanced by employing men educated in sanitary science as sanitary agents and inspectors, and that this could be best accomplished through the establishment of separate institutions for the education and training of such sanitary inspectors. The resolutions, as amended by the committee, were adopted after discussion by Dr. Benjamin Lee of Philadelphia, Pa., who said that all institutions should have departments of sanitation, since naturally, health officers and inspectors would be of a better and more efficient class if properly instructed in sanitary science, whereas the fact is, that in the United States men are put in positions for the enforcement of regulations for the protection of the health of the community who are not qualified to serve, and this because they have had no opportunities of prior education; and by Dr. Henry Mitchell of Asbury Park, N. J., who said that the United States ought to pay tribute to England in this matter, where for twenty years a system has been in operation for the training of men for the inspection service, and though it is not obligatory to have a certificate of the Sanitary Institute as a precedent of employment, still it is customary to employ such by preference. In New Jersey the first step has been taken toward the training of sanitary inspectors. Rutgers College of New Jersey has already begun to grant certificates of competency in matters relating to details of the sanitary inspector's duties. The resolutions offered are designed to encourage this effort, especially for the education of executive sanitary officers. The men engaged in this work are usually physicians, who have no knowledge of the practical details of their work, which they have to learn for themselves in the school of experience, so there ought to be post graduate courses in colleges to supply the particular information lacking.

2. The second resolution reported by the executive committee with the recommendation that it be adopted, which was done, directed the publication committee to abandon the form of publication of the transactions in quarterly issues, and return to the former plan of a single annual volume, uniform in type, paper, size, make-up and binding with such volumes, the chairman of the publication committee having explained that it was entirely feasible to have their single volume printed and distributed as soon as the first number of a quarterly series could be issued.

3. The resolutions offered by Dr. Cressy L. Wilbur of Lansing, Mich., Chairman of the Committe on Demography and Statistics in their Sanitary Relations, were recommended for adoption, which was unanimously done, and seventy-five dollars appropriated for the necessary clerical work of the special committee in carrying them into effect. The resolutions contemplate the procurement of the establishment of Vital Statistics officers in non-registration States, the general adoption of the Bertillon system of identification as a basis of classification, the institution of uniform methods of registration in the next census report, and the establishment of an international alliance and co-operative method between all national and foreign departments of vital statistics.

4. The resolution offered at the previous meeting to reduce the annual dues from five dollars to three was referred back

without recommendation, and was on motion laid upon the table by the association.

The Secretary then read the names of fifty applicants for membership, who were recommended for election, which was accordingly done.

The reading of papers announced upon the program was then begun with

A SHORT HISTORY OF SEWAGE DISPOSAL AT THE ASYLUM FOR INSANE AT LONDON, ONT.,

by Dr. R. M. BUCKE, superintendent, the paper being read in the absence of the author, by Dr. Peter H. Bryce, secretary of the Provincial Board of Health of Ontario.

Dr. BUCKE described the various systems of sewage disposal at this hospital since its opening for the reception of patients in 1870, down to the present day. The sewage was first thrown into a small creek, a branch of the Thames, which in dry weather constituted a nuisance of which the neighbors complained. Charcoal and gravel filtration was in vogue, with varying success, for fifteen years. Complaints were made from time to time and intensified by the appearance of typhoid fever in London. The system of intermittent downward filtration was finally instituted. Alternate beds and trenches with drainage through tile-lined conduits were spread over a wide area, but experience showed the latter were useless, and when subsequently taken up it was found that nothing had passed through. The sewage beds are on a higher level than that of the asylum. One thousand inmates, of whom two hundred are sane people, produce daily 75,000 gallons, requiring two and a half hours to flow through to the beds, and in six hours it is completely absorbed in the soil, reappearing as pure spring water. There is no pollution of the soil. The sewage always disappears. The experiment of establishing a vegetable garden has been successful, crops of fruit and vegetables of the value of $200 to the acre having been produced. The system of sewage disposal so completely satisfactory at Dr. Bucke's institution is simply nature's own plan of refuse riddance by returning it to the earth.

THOMAS MACFARLANE, Esq., F. R. S. C., chief analyst of the Inland Revenue Department of the Dominion of Canada, followed with a paper entitled

REMARKS ON THE DISPOSAL OF REFUSE IN SOME EUROPEAN CITIES.

detailing results of official visits and inspection of the methods in vogue in England and Germany. He agreed with Dr. Vogel that no one method can be arbitrarily said to be the best everywhere. In his opinion the direction of improvement in the large cities lies in the exclusion of surface water, and in towns of 30,000 inhabitants, he believed the moss litter system will be the best, as used at Caledonia Springs, Ont. He exhibited a specimen of moss litter, which he described as an intermediate form of peat. He strongly indorsed the system practiced at the asylum for the insane at London, Ont.

Mr. G. G. HORETSKY, C.E., read a paper entitled "The Most Recent Methods of Sewage Disposal and their Application to Certain Cities in Ontario," and was followed by Capt. W. F. VAN BUSKIRK, C. E., of Stratford, Ontario, "On the Filtration of Sewage."

Discussion of the groups of papers on sewage disposal was opened by Dr. Hurtig, secretary of the State Board of Health of Indiana, who, having inquired of Mr. Macfarlane, where moss-litter can be obtained, was told by the latter that it was found on the upper layer of broad savannas in Canada and that it was simply moss which had ceased to live. It was not peat, but was intermediate between this and the green moss of the surface. It differs from peat in that it is spongy and can be broken up, while peat can not be. Moss litter has an extraordinary power of absorbing moisture and ammonia, which makes it valuable for bedding in stables. It gives off its absorbed water readily but retains the ammonia. It is eight times more effective than dry earth; one hundred pounds of it will render inoffensive eight hundred pounds of excreta.

Dr. BOARDMAN of Ottawa said the objection to most methods of sewage disposal was the fact that the products of the several expensive mechanical processes have no value.

"The Interpretation of the Chlorin Number in Well Waters" by A. MCGILL, Esq., M.A., was read by title and was followed by a paper on

THE FARM WELL

by F. T. SHUTT, Esq. M.A., urging the importance of instructing the rural population as to the dangers to health from the polluted wells, since four-fifths of the population reside outside of the cities, and cited the barnyard well as an especial and very common source of danger.

Mr. MACFARLANE dissented from the opinion that legislation can not accomplish much but that we must trust to education, and said that education was a very slow process. If only existing legislation is properly carried out, it will accomplish much. Health officers have the right, if they can fearlessly exercise it, to expose existing nuisances and call the attention of the authorities to them, and this as well with respect to the care of cattle and the supply of water for man and beast.

Dr. PROBST of Columbus, Ohio, said that there was no doubt that the majority of cases of typhoid fever in rural districts was due to impure well water, and recited an interesting case in his experience as member of the State Board of Health of Ohio of a recent outbreak of twenty-one cases of the disease in a locality where fifty years ago a similar outbreak had occurred. A well used at that time had been filled up and abandoned for over thirty years. New owners came into possession, and the old well, which was in the side of a hill, was cleaned out and deepened—and its use followed by the renewed poisoning of those who drank its water.

Dr. PATTERSON of Winnipeg, Manitoba, said there was no doubt that typhoid fever is the prevailing disease of this region and equally no doubt that polluted well water was its source, and he insisted that the necessity that the farm well should be abandoned is as great as that privies in cities should be disused.

Dr. HURTZ agreed with the other speakers as to the objectionable sites of the ordinary farm well and insisted that it should be in front of the house instead of in the rear as customary.

Dr. CURTIS of Ottawa, did not think cementing a well was sufficient to exclude polluting agents.

TUESDAY, SEPTEMBER 27—AFTERNOON SESSION.

Dr. JOHN L. LEAL, Health Officer of Paterson, N. J., read a paper entitled

AN OUTBREAK OF TYPHOID FEVER DUE TO AN INFECTED PUBLIC WATER-SUPPLY,

which he presented because it established the fact that a single case of typhoid may so infect a large body of water as to reproduce itself among those dependent upon this same body of water for their public supply, even though said supply was taken at some distance from the point of infection. Most hitherto well authenticated outbreaks of typhoid fever have been where the infected water was small in bulk or the infection great and its action more or less continuous. In this outbreak, the bulk of water infected was large, its infection sharply defined, and its origin in a solitary case of typhoid in the person of a resident, who returned from a summer resort ill with the disease. The water-closet receiving the discharges of this patient was connected with a series of cess-pools by overflow pipes, the last of the series discharges through a hidden pipe into the river, which was more or less continuously infected from September 18th to November 14th, when the hidden discharge pipe was discovered and further infection from that source prevented. Subsequent to this, the cases of disease gradually diminished and within a fortnight entirely ceased. Dr. Schwartz of Rhode Island and Dr. Connelly of New Jersey, commented upon Dr. Leal's paper without questioning his conclusions.

The Report of the Committee on "The Cause and Prevention of Infectious Diseases" was presented by its Chairman, Dr. PETER H. BRYCE of Toronto, secretary of the Provincial Board of Health of Ontario; ordered to be printed, and the committee continued. The excellence of Dr. Bryce's report was universally admitted. Its literary merit, conciseness of expression and exhaustive character entitle it to be considered among the admirable committee reports, which have emanated from this association.

WHAT CONSTITUTES AN EPIDEMIC?

was the title of a paper read by Dr. BENJAMIN LEE, secretary of the State Board of Health of Pennsylvania and Health Officer of the city of Philadelphia, and which ably discussed the question as to whether numbers of cases, rapidity of spread or malignity of disease should determine the epidemicity of an outbreak. Machiavelli uttered the famous aphorism "Words are the counters of wise men, the coin of fools." Another equally distinguished diplomat (liar) has informed the world that the object of language is to conceal ideas. In the word *epidemic*—a "coin" or a "counter"—practically, as employed at the present time, it is simply used to describe the presence of a communicable disease in some other fellow's town." Inasmuch as the reluctance of the resident physicians and especially the authorities of a town, to acknowledge the existence of an epidemic is founded upon a purely commercial basis, having no other motive than the fear of the diminution of trade, while the readiness of those of the neighboring town to proclaim it is based upon a wholesome and instinctive aversion to contracting the supposed infection, is it not remarkable that

the view of the latter rather than that of the former should be adopted as that of the sanitarian? In other words should not rapidity of spread rather than the number of cases be recognized as the true test? Dr. Lee's contention is that the actual number of cases of a contagious disease in proportion to the population as the criterion for the declaration of an epidemic "has nothing to do with the case any more than the flowers that bloom in the spring," but that the rapidity of spread shyuld be solely considered. The Board of Health which, having knowledge of such condition, purposely conceals it, or still worse, denies it, is guilty of a crime of hideous proportions, none the less so because it is acting in obedience to the behests of the business portion of the community or from a mistaken sense of local patriotism.

The discussion following the report of Dr. Bryce and the paper of Dr. Lee became general. Respecting the former, Dr. Gehrman of Chicago suggested the question as to the proper time of isolation of diphtheritic cases, since the bacillus often persists after the case is apparently well.

Dr. HOLTON of Brattleboro, Vt., spoke of the undoubted presence of the bacillus of diphtheria in individuals who have not been sick with the disease. He asked what should be done with people going around with them who are apparently well? Is it fair to quarantine those who have been ill and yet who are apparently well, but still have bacilli discoverable in their throats?

Dr. BRACKEN of Minneapolis, Minn., said if any healthy person was found to have the bacillus in his throat he ought to be quarantined. The time limit in Minnesota was four weeks.

Dr. CHAPIN of Rhode Island thought it very rare that the bacillus was found in healthy people, but he believed it to be equally dangerous. In families where diphtheria has prevailed about 20 per cent. are found to have bacilli in their throats. In an orphan asylum within his knowledge, twenty-five cases of the disease occurred, and about 20 per cent. of all the children were found to have bacilli, and of these two or three became sick with the disease, and one case was carried to another institution by a child who was not sick.

Dr. PATTERSON of Winnipeg, Man., knew of three cases, in one of which the bacillus was found thirty days, in a second thirty-five, and in the third forty days after they were severally supposed to be well.

Dr. JONES, health commissioner of Baltimore, detailed the precautionary measures enforced in that city; Dr. Probst of Columbus, Ohio, Dr. Burroughs of Asheville, N. C., and Dr. Wright, of New Haven, Conn., spoke of the practice in their respective cities.

Dr. SCHWARTZ, secretary of the State Board of Health of Rhode Island, asked, referring to Dr. Lee's paper, whether tuberculosis ought not to be considered epidemic throughout the civilized world.

Dr. LEE said that the distinction ought to be made between endemic and epidemic, under the former of which tuberculosis might be properly classed.

Dr. WINGATE, health commissioner of Milwaukee, Wis., thought a special committee might be created to define "What is an epidemic?" and offered a resolution to this effect, which was referred to the executive committee. The discussion was closed by Dr. Hurty, the secretary of the State Board of Health of Indiana.

The paper presented by Mrs. ELLEN H. RICHARDS, of the Institute of Technology, Boston, Mass., on "The Urgent Need of Sanitary Education in the Public Schools," was read by Dr. Henry Mitchell, secretary of the State Board of Health of New Jersey. The writer claimed that the Cuban war has shown that sanitation has not been taught to the people, and that the only way in which this can be reached is through the public schools. The lamentable ignorance of the volunteer soldiers in matters of food and clothing would not have existed had they been properly educated. Professor Robinson of Bowdoin College, Brunswick, Me., and Medical Director Gihon, U. S. N., dissented from the opinion that public school education could accomplish much in this direction.

Dr. HURTY of Indiana read the paper on "Theater Sanitation," prepared by Mr. WILLIAM PAUL GERHARD, C. E., of New York City.

EVENING SESSION.

The customary public meeting for the formal reception of the Association by the local authorities and the annual address of the President was held in the city hall and was opened with prayer by the Rev. WILLIAM MOORE, D.D.

Addresses of welcome were then delivered by Hon. Sydney Fisher, M.P., Minister of Agriculture, whose department embraces the sanitary interests of the Dominion of Canada; by Sir James Grant, M.D., K.C.M.G., F.R.S.C.; by Samuel Bingham, Esq., Mayor of Ottawa, and by W. G. Black, the several speakers being introduced by Dr. John Sweetland, chairman of the local committee of arrangements.

Dr. GREGORIO MENDIZABAL of the City of Mexico responded eloquently in French to the special greeting extended to the Mexican members.

Dr. BENJAMIN LEE of Philadelphia then took the chair, introducing, after some witty and felicitous remarks, the president of the association, Prof. Charles A. Lindsley, M.D., of New Haven, Conn., who then delivered the President's Annual Address.

WEDNESDAY, SEPTEMBER 28—MORNING SESSION.

The Association was promptly called to order by the president at 9 o'clock, to permit acceptance of the excursion to Hull, Aylmer and Victoria Park and thence on the Ottawa River to Chats Falls and a dinner at Victoria Hotel, Aylmer, P. Q., tendered by the municipality and citizens of Ottawa.

Dr. PROBST, the secretary, reported from the executive committee the resolutions offered by Dr. WILBUR of Lansing, Mich., for the appointment of a commission of nine members, three from each of the nationalities represented in the association, to co-operate in the establishment of bureaus of vital statistics for the collection of such statistics under the Bertillon system of classification, and these were adopted as recommended.

The names of twelve new members were recommended for election and were accordingly elected.

The report of the committee "On the Etiology of Yellow Fever," was then presented by the chairman, Dr. HENRY B. HORLBECK, health officer of Charleston, S. C., and a supplementary report on the same subject by Dr. EDUARD LICÉAGA, president of the Superior Board of Health of the Republic of Mexico, a member of the committee.

The committee was continued, and also the committee of seven appointed at the previous meeting to wait upon the President of the United States with a view of obtaining the appointment of a bacteriologic commission to go to Havana to study the causes and methods of prevention of yellow fever. This special committee was reconstructed to consist of Dr. Henry B. Horlbeck of Charleston, S. C.; George M. Sternberg, Surgeon-General U. S. Army; Dr. Alvah H. Doty of New York City, Dr. Samuel H. Durgin of Boston Mass.; Dr. R. D. Wilkinson of New Orleans, La.; Mr. Josiah Hartzell, and the State Health Officer of Texas, to succeed Dr. R. M. Swearingen, deceased.

Dr. LICÉAGA presented the seventh of a series of reports on yellow fever, to modify a former statement in the report of last year, that "there are only two foci of endemic yellow fever in the whole of the Gulf Coast of Mexico and these foci are found in the Canton of Vera Cruz and in the district situated in the northern part of the Peninsula of Yucatan." This statement was made before the Superior Board of Health had absolute knowledge of the two cases observed in Campeche and before the appearance of the epidemic in Tampico, and consequently before the investigation was commenced which proved that these cases were *not* the result of the importation of the disease. Hence, Dr Licéaga said, we have to withdraw our absolute statement that there are only two foci of endemia on the Mexican Coast of the Gulf of Mexico. Dr. Licéaga's declaration that the sanitary authorities of Mexico have firmly resolved *never* to hide any case of transmissible disease that may come to their knowledge and that they have determined that their official documents shall express the truth only so far as absolute facts are known, was greatly applauded—as an evidence of the proper spirit in which the work of the committee of which he is a member should be conducted.

Dr. WALTER SUITER of Herkimer, N. Y.; Dr. WILKINSON of New Orleans, La., and Dr. S. W. BATTLE, U. S. N., participated in the discussion of the reports of Drs. HORLBECK and LICÉAGA, eliciting the declaration that there was no analogy recognized between any of the forms of malarial fever; that the "calentura" of Mexico is paludic, and that neither it nor the severest forms of bilious remittent fever give any immunity against an attack of yellow fever; that the microbe of Laveran is positively distinctive; that so far the microscopic germ of yellow fever can not be said to have been discovered, but that the bacteriologic investigation which it is the object of Dr. Horlbeck's special committee of seven to induce the President of the United States to inaugurate, may confidently be expected to reveal its identity.

The report of the committee "On the Cause and Prevention of Infant Mortality" was then presented by the chairman, Dr. ERNEST WENDE, commissioner of health of the City of Buffalo, N. Y., and pursuant to the recommendations of the committee, Dr. SUITER of Herkimer, N. Y., offered the following resolution, which under the rules, was referred to the executive committee:

*Resolved*, That it is the opinion of the Public Health Association that the State, city and town health authorities and local sanitary societies generally should exercise every possible effort to procure the enactment of laws in their respective States, cities, towns and villages to prohibit the sale of the so-called long rubber-tube nursing-bottle as being a perniciously active agent in the cause of preventable disease in infancy of the most serious character and fatality.

Dr. IRVING A. WATSON of Concord, N. H., president of the State Board of Cattle Commissioners and secretary of the State Board of Health of New Hampshire, read an admirably written paper entitled

SOME OBSERVATIONS FROM PRACTICAL EXPERIENCE WITH BOVINE TUBERCULOSIS IN NEW HAMPSHIRE.

The tenor of the paper was to the effect that the danger of infection from bovine tuberculosis has been greatly over-rated and that whatever danger exists arises almost entirely, if not wholly, from those animals in which the disease is so far advanced that it may be detected by a competent veterinary surgeon upon physical examination, barring, possibly, the localized appearance of the disease in the udder, in which event the tuberculin test would determine the diagnosis. The following concluding propositions were presented:

1. That it is impossible to eradicate bovine tuberculosis, but that it may, without inflicting too great a burden upon the State, be reduced to a degree that will subserve the interests of the stock-raisers and likewise protect the public health.

2. That a very small percentage of the animals infected with tuberculosis in any way endanger the public health, and that an indiscriminate slaughtering of the cattle reacting to the tuberculin test is wholly unnecessary, inasmuch as many of them either recover or the disease is permanently arrested.

3. That a proper sanitary condition of stables and stable inclosures would do more toward preventing the spread of bovine tuberculosis than any other measure that could be adopted.

4. That the danger of infection from bovine tuberculosis may be reduced to very small proportions, if not wholly eradicated, by sanitary measures, inspections and physical examinations by the State, in co-operation with local authorities.

5. That such inspections once inaugurated could be maintained without an expense that would be burdensome to the State.

Dr. A. DE SCHWEINITZ, chief of the Biochemic Division of the Bureau of Animal Industry, Washington, D. C., read a paper on "A Convenient Method of Staining Tubercle Bacilli."

Sir JAMES GRANT, M.D., of Ottawa, commended very strongly the propositions advanced by Dr. Watson.

Dr. GIBSON of Iowa dissented as to the ability of veterinarians, however skilful and experienced, to recognize tuberculous cattle by mere physical examination however thorough. He would quarantine a tuberculous cow reacting to the tuberculin test as he would a glandered horse. The slaughtering room is the only place for them.

Dr. BRACKEN of Minnesota, deprecated the effect of Dr. Watson's paper as calculated to occasion loss of confidence in the tuberculin test.

Dr. DURGIN said that we must have the people with us if we hope to succeed in sanitary work. In Massachusetts, radical and extreme measures had been found to defeat their object.

Dr. WOODWARD, health officer of the city of Washington, asked who were the people—the dairymen who sell, or the citizens who consume the milk? In Washington the people themselves demand the application of the tuberculin test.

After further remarks by Dr. Bryce of Toronto, and Dr. de Schweinitz of Washington, Dr. Watson closed the discussion, defending the propositions he had presented, and the association then adjourned until Thursday morning, to accept the courtesies tendered by the city of Ottawa for the afternoon and evening.

*(To be continued.)*

## Cincinnati Academy of Medicine.

*Regular Meeting, September 26.*

Dr. MERRILL RICKETTS exhibited a patient who had been operated on just one week previously for right inguinal hernia. The radical operation was the one performed. The operator reported the case as he wished to call attention to the short time the operation required, eight and one-half minutes, and also to emphasize his opinions as to the great value of properly prepared kangaroo tendon for buried sutures. The sutures he always kept, until used, in alcohol, to which a little resin had been added. The resin he claimed prevented the hands slipping when the suture is pulled home.

Dr. LYLE exhibited the specimens of a case in which a tubercular infection had involved the pericardium and peritoneum, while the lungs were but little diseased. The trouble probably originated in the bronchial glands. The pericardium showed a caseous exude about half an inch thick over the left ventricle and about a qurter of an inch over the right side of the heart. In the abdomen was found, in addition to the tubercular peritonitis, great thickening and involvement of the omentum. The stomach had been invaded by a large carcinomatous growth at the pyloric orifice; this had ulcerated through into the general peritoneal cavity, which proved to be the immediate cause of death. The man was 44 years of age. Dr. E. W. Mitchell, who had had the case before he had been sent to the consumptive hospital, had had considerable trouble in deciding upon the diagnosis. The examination of the blood repeatedly showed the absence of the plasmodium, and the reaction of Widal had also proved negative. The lungs were apparently normal. The stomach contents showed the absence of free hydrochloric acid, and also of lactic acid. Chills and fever occurred not infrequently. The use of tuberculin was determined upon for diagnostic purposes, but the first injection proved entirely negative. Not satisfied with this, however, a new solution was obtained, and the injection this time was entirely successful, a decided chill, some fever, and marked constitutional reaction following.

Dr. MAGNUS TATE reported a case in which a double pyosalpinx operation had been performed, the patient at first reacting strongly; within forty-eight hours of the operation, she unfortunately fell out of bed; soon collapse set in, and in spite of every aid, she went from bad to worse and soon died. Opening the wound, just before death, he found a small opening in the gut. The case, during operation, has been a most difficult one on account of strong adhesions present. He had been most careful to examine the bowel before closing the external incision for this very thing, but had been unable to find a weak point. He thought that the accident after the operation had caused some weak point to give way under an increased strain. Discussion was by Drs. Reed, Bonnifield and Zinke, who agreed with the speaker as to the cause of the perforation.

Dr. ED. RICKETTS reported a case of appendicitis in which a concretion had ulcerated through the appendix, producing a fatal peritonitis. He also exhibited a gall-stone he had removed by operation, which weighed 388 grains. Discussion was by Drs. Twitchell, Reed, Zinke and Bonnifield.

Dr. MEYER HEIDINGSFELD read the report of a case of spontaneous rupture of a prostatic abscess into the rectum and urethra, followed by recovery. L. A., 21 years of age, was infected with gonorrhea on July 3; prostatic abscess formed and opened into the rectum on July 30. Reinfection from the rectum followed; a second abscess formed and ruptured spontaneously into the urethra, August 30. The case then became complicated with epididymitis, hydrocele and abscess of the left testicle, which latter was incised, and patient was discharged one week later without urinary fistula.

Dr. S. E. ALLEN reported a case of mastoiditis in which septic infection with the formation of abscesses in various parts of the body occurred without involvement of the lateral sinus. He thought that the emissary veins carried the infection.

## The German Congress of Ophthalmology.

*Held at Heidelburg in August.*

Landolt of Paris presided at the first session. The first address was by NORMAN HANSEN of Copenhagen on

SYSTEMATIC SUTURE OF THE CONJUNCTIVA ALONE, WITHOUT SUTURE OF THE SCLEROTIC, FOR SEVERE WOUNDS OF THE EYEBALL.

He recommends suturing the conjunctiva, even in deep perforating wounds. This protects from infection and produces an even pressure which holds the lips of the wound in contact on an even plane. In all cases of large perforating wounds of the sclerotic, with or without the participation of the cornea, he first enlarges the conjunctival wound to the corneo-sclerotic limbus and then carries the scissors half around the corneal margin, detaching the conjunctiva, with the subconjunctival tissue, after which the two flaps are drawn together over the wound in the sclerotic and over the corresponding segment of the corneal surface, with two or three fine stitches. He then applies a cotton pad, held in place with a wide gauze bandage, but without compression. He changes the pad twice a day on account of the copious serous, non-infective secretion. His clinical experience proves that this suture is sufficient to prevent infection and that it is an effective defense against prolapsus of the vitreum and choroidea. Experiments have shown that the largest wound gap in the sclerotic is completely filled

with granulations in six days. The sutures will certainly hold that length of time if they are taken deep enough in the subconjunctival tissues, and in the episclerotic, with extensive lesions. He added that every case he now cures so simply and easily without either primary or secondary infection, is haunted for him by the ghosts of the eyes he has lost in former years with expectant treatment, by primary or secondary infection, staphyloma or cicatricial shriveling. If the lens is injured, or it is found difficult or impossible to replace it without loss of vitreous humor, he performs iridectomy, to allow the lens more space. The suture in the conjunctiva does not tear out; with cocain it is painless, and it is applicable to the most extensive lesions. He related a typic case thus treated: a workman hit in the eye by a sharp chisel falling from a height, as he was looking up. It cut the eyeball from the upper edge of the cornea to the inferior conjunctival fold, slitting also the iris and lower eyelid, the lens escaping through the long gaping wound. He sutured the conjunctiva alone, as above described, over the wound to the center of the cornea. The wound healed in ten days and now, a year later, the functions of the eye are perfect, counting fingers at six meters, with a restricted field.

AXENFELD explained the fact that the newly-born can not shed tears until about the seventh week, due to the unfinished condition of the central nerve-tracts, not only the cortical—necessary in psychic weeping—but also the reflex tracks. The lachrymal glands are comparatively completely developed.

SUGRIST called attention to the

DANGER OF BLINDNESS FROM LIGATURE OF THE CAROTIS COMMUNIS OR INTERNA,

describing a couple of observations in which the corresponding eye became atrophied and blind after the carotis communis and interna had been ligated to arrest hemorrhage, during the extirpation of a carcinoma of the tongue in one case. In the other, the carotis externa and interna had been ligated in a young man on account of exophthalmus pulsans traumaticus. Embolism of the central artery followed in both, and the necropsy of the first case showed a thrombus in the arteria ophthalmica, and an obstructing embolus in the arteria centralis retinæ.

UHTHOFF reported some cases of "Visual Hallucinations from Affections of the Eyes" a few limited to one side.

SILEX of Berlin stated that the "Central Innervation of the Muscles of the Eye" is derived from hitzig center, part of the facilis center. It controls the voluntary movements of the eye, at least of the abducens and obliquus superior. Stimulation of this center in a case of unilateral traumatic nystagmus produced movements in the eye of the opposite side.

ABELSDORFF stated that Malays, Mongolians and negroes examined were remarkably free from astigmatism of the cornea, compared to civilized races; when found it was very slight.

GROENOUW judges from a study of forty cases of ophthalmia neonatorum that the clinical picture is not an absolute guide to the bacterial agent of the affection. Gonococci were found in the conjunctiva in some cases, after the secretion had ceased. The pneumococcus was found in a number of cases. It indicated a benign course of the affection.

RAHLMANN recommended the mucous membrane of the lips for "Marginal Plastic Operations," as owing to its resemblance to the conjunctiva, it is especially adapted to heal in its new situation without delay or alteration of structure.

SATTLER described his simplified operative treatment of myopia. He extracts the lens in cases of extreme myopia without preceding discission, first incising the cornea, 6 to 8 mm., lifting the anterior capsule with a hook and taking out with the Daviel spoon as much of the lens substance as possible. The final discission is not hastened. Thirty cases thus treated were distinguished by the rapid recovery and slight post-operative astigmatism.

On account of the International Congress of Ophthalmology to be held next year, at Utrecht, the German Congress will not convene again until 1900.

## French Congress of Alienists and Neurologists.

*Held at Angers in August.*

The chief subject under discussion at this meeting was

POST-OPERATIVE MENTAL DISTURBANCES.

As already noted in our editorial (page 798), RAYNEAU stated in his address that all the various pathologic mental conditions have been encountered in the psychoses consecutive to operations, and that there is no special type. A hereditary or acquired predisposition is generally admitted (except in certain operations on the skull and thyroidectomy), the traumatism is only the last drop that makes the vessels overflow. Some patients even request an operation, simulating a disease if necessary, because they are already mentally affected. In a number of cases related, the psychosis following the operation was found to have been preceded by more or less transient mental disturbances in the past when thoroughly investigated. Statistics, he stated, show an average of one psychosis to fifty surgical interventions. Out of 68 cases on record, 5 have become chronic; 13 lasted a month or two; 33 nearly a year; in six duration is unknown.

RÉGIS considers the confusional the usual type. Delirium immediately following the anesthesia is due to chloroform intoxication supplementing the nervous shock. Delirium appearing from the second to the tenth day is due to septicemia, to accidental infection or to auto-intoxication caused by the interference with the nutritive processes by the nervous shock.

PICQUÉ observed that, in his experience, mental disturbances very rarely follow operations on the uterus and adnexæ, while they are frequent after vaginal or perineal operations on predisposed nervous subjects. In these cases the lesions are accompanied by subjective symptoms, and the patient is already under the dominion of a fixed idea when she comes to the surgeon.

TERRIEN described three typic cases of post-operative hysteric paralysis and mental disturbances, cured by suggestion supplemented by the thermocautery and electricity, using a different style of battery on account of the "suggestion," if the first proved ineffectual. He also urged the necessity of special training in mental pathology in the medical colleges, to enable the general practitioner, particularly in the country, to handle the cases of insanity he may meet. Out of nineteen delirious cases in the last ten years, he has only sent five to asylums. He treats the rest at home, where they are better off, while it relieves the crowded asylums.

RÉGIS attributes the unsettled condition of the question of post-operative psychoses to the fact that they are not seen by alienists until fully established.

MONTPROFIT reported five in the course of 3000 operations.

GRANDJUX observed that they are not encountered among soldiers, as selection eliminates the predisposed, and that the rôle of the traumatism is insignificant, mentioning as an instance in proof that not a single psychosis occurred among the 931 soldiers wounded at Froeschwiller and exposed to innumerable privations.

LADAME called attention to the dangers of morbid suggestion, relating the case of a lad of 10, trephined for some traumatism, but recovering perfectly and in excellent health for years, when he met the surgeon again. The latter expressing his surprise and gratification at his patient's good health, happened to describe the mental disturbances that might have resulted from the intervention. A psychosis promptly followed.

DOLÉRIS has recently reported three cases of mental disturbances consecutive to a benign gynecologic operation. One patient imagined that the entire external genital region had been removed, unconvinced, except for the moment, by inspection and palpation. Another returned again and again for the surgeon to assure her that her anus had not been closed; another was convinced that the perineum was unbroken by any orifices. The cases were otherwise in perfect health. One recovered after several months of hydrotherapy, exercise and hypodermic injections of glycerophosphate. He observes that if we could divine the secret morbidity that leads women to ascribe all their troubles and ailments to the hypogastrium, many interesting problems in gynecology might be solved.

The second address, on

TRANSIENT DELIRIUM FROM A MEDICOLEGAL POINT OF VIEW,

classified this delirium according to its etiology as: 1, melancholia mania; 2, emotive; 3, brief, irresistible impulses; 4, puerperal and menstrual; 5, a neurosis—epilepsy, hysteria, neurasthenia or ophthalmic migraine; 6, intoxication—alcohol, etc.; 7, affection of the nerve-centers and nerves; 8, diseases other than nervous; 9, disturbances in sleep—state intermediate between sleeping and waking; somnambulism; prolonged dreams; 10, momentary aberration. The French school do not admit the idiopathic, transient insanity accepted by the Germans—Krafft-Ebing, Kroepling, Swarzen and Wendel—who believe that a form of transient mental alienation may occur in perfectly normal individuals free from any hereditary predisposition and any pathologic anterior conditions, such as epilepsy, alcoholic intoxication, etc.

MOTET has never encountered such a case in all his long experience. It has often been difficult to discover the determining cause of an apparently insane act, but he has always discovered it at last; in some cases it was epilepsy, in others intermittent fevers, etc. There are crimes of passion which resemble the acts of insanity but must not be confounded with them.

CHARPENTIER observed that besides the transient delirium depending upon known causes, there are others whose cause is unknown, but that it does not follow that they have no cause, adding that Motet's experience reminded him of the judge who remarked that during his entire professional career he had never seen a single example of a judicial error. He claims that a crime committed during an attack of transient delirium, whatever may be the known or unknown cause of the delirium, does not come under the jurisdiction of the laws which assume criminal responsibility.

LALANNE called attention to the transient delirium that may proceed from a transient congested condition of the brain, citing an instructive example.

In concluding a discussion of a case of myelitis and flaccid paraplegia, PIERRET explained the fact that the inferior members have convulsive movements when the neurons controlling their movements are separated from the cortical centers, by the assumption that there is a constant tendency in the entire nervous system to the realization of an equilibrium of latent dynamism; the medullary segment, isolated, is forced rapidly to a condition of exaggerated potentiality, whence the discharges, spasmodic in character. But healthy cells are indispensable to the phenomenon. If the neurons are diseased, if the nerve tubes are altered or if the muscles are no longer normal, the convulsion does not occur. The connection between general paralysis and mental degeneracy was noted by Joffroy, although Magnan considers the latter secondary, and that general paralysis depends more upon the "way one lives" than any other cerebral affection. It is rare among imbeciles, but ten cases are on record, confirmed by the necropsy.

An interesting study of "Arteritis in the Pathology of the Nervous System" was presented by COULON, who restricts its rôle almost exclusively to the secondary lesions it occasions: aneurysmal dilatation and the phenomena, generally local, which it determines; diminished size from the thickening of the arterial walls, which may lead to ischemia; obliteration by embolism or thrombosis which causes softening in spots, and finally the rupture of arteries with all their concomitant symptoms.

The next Congress will meet at Marseilles in April, 1899; the subjects selected for discussion are: "Secondary Systematic Delirium;" "Polyneuritic Psychoses," and "The Unrecognized and Condemned Insane."

## PRAGTICAL NOTES.

**Lipoma of the Foot.**—Kleinknecht reports one case in the thirty-two observations on record, in which the lipoma was mistaken for a sarcoma and the foot unnecessarily amputated, but usually the diagnosis is unmistakable. The treatment is the complete ablation of the tumor, which can be accomplished without a plantar scar, through a dorsal incision, if the metatarsal bones are spread wide enough apart.—*Beiträge z. Klin. Chir.*, XX, 2; *Semaine Méd.*

**Test Paper for Iodin in Saliva and Urine.**—A sheet of filtering paper is dipped in a 5 per cent. solution of cooked starch. When dry it is marked off into 5 cm. squares, and in each square two or three drops of a 5 per cent. solution of ammonium sulphate are dropped and dried, sheltered from intense light. The ammonium sulphate loses its power in two or three weeks; it is best applied fresh. To test the intestinal absorption let the subject swallow a glutoid capsule containing a little iodoform. Then mark the hour on the first square, and number the rest. The subject then deposits some saliva on the corresponding square every hour, and an exact record of the intestinal absorption is obtained, as the paper turns blue in contact with any traces of iodin.—*Semaine Méd.*, September 7.

**Iodin for Acute Gastro-Enteritis.**—Iodin has been recently recommended by Grosch (JOURNAL, page 302), and P. A. Bizine of Russia also proclaims its remarkable efficacy in acute gastro-enteritis. He administers to children with diarrhea or cholera infantum, a teaspoonful every hour, of the following: Emulsion of castor oil, 180 grams; essence of peppermint, 3 drops; essence of cloves, 5 drops; tincture of iodin, 10 drops; chloroform, 2 drops. The bottle must be kept on ice to prevent decomposition. If a slight diarrhea persists after the contents have been taken, he gives two powders a day, in water, as follows: Iodized starch, 75 centigrams. For six powders. The proportions are increased for an adult: Emulsion of cast oil, 180 grams; essence of peppermint, 5 drops; essence cloves, 7 drops; tincture of iodin, 15 drops; chloroform drops. A tablespoonful every hour. When the principal mo bid symptoms have subsided—usually in twenty-four hours he gives 60 centigrams of iodized starch every four hours. cases of cholera nostras he administers the following at o dose: Castor oil, 20 grams; essence of peppermint, 3 drop tincture of iodin, 10 drops; chloroform, 2 drops; supplement ing the medicine with an injection of tepid water if the purg tive effect is not prompt; hydrochloric lemonade for beverag mustard plasters on the joints to relieve cramps, and h water bottles to keep the patient warm, completing the treat ment with the iodized starch as above.—*Semaine Méd.*, Sep tember 7.

**Aseptic Catheterism.**—Dr. C. Mansell Moullin has given an interesting and practical paper to the London *Lancet* of Sep tember 10, on the subject of urinary fever at the beginning of catheter life and of aseptic catheterism. He says of asepti catheterism that it is one of the problems of modern surgery He has been called upon to deal with it especially in cases of which there has been a large amount of residual urine. The following are the essential features of Dr. Moullin's very suc cessful measures: All instruments must be disinfected first by boiling. The hands, the prepuce and the skin of the penis must be cleansed as thoroughly with soap and water as if a surgical operation were going to be performed, and then sponged over with a solution of corrosive sublimate, 1 500. The glands of the meatus require especial care. An irrigating catheter is then introduced into the fossa navicularis, and this part of the canal is thoroughly washed out from behind with boric acid. Then the catheter is pushed on into the deep part and the process repeated. Finally, Melchior's double catheter is introduced and the urine drawn off. In this way it is pos sible to obtain a very high degree of asepticity. When cathe ters have to be passed at frequent intervals, the disinfection of the hands, penis and front part of the urethra will manifestly be never carried out each time. At the outside it will only be done night and morning, and often one has to be content if it is done thoroughly once a day. But catheters can be kept clean. Those made for me, as smooth and polished on the inner surface as they are on the outer, will stand boiling day after day (if they are kept straight while in the boiling water and drained afterward) and continued immersion in boric acid without injury. Each patient is provided with two glass cath eter cases. One of these is filled with boric acid lotion for in struments that have been used; the other, provided with a rubber cork as well as a metal cap, is dry and aseptic. These cases are so arranged that they can be hung up in the patient's wardrobe, out of sight and out of dust. No catheter is used more than once a day. As soon as a catheter is withdrawn from the urethra it is dropped into the case filled with boric acid solution and left there. Once a day all the catheters are taken out, boiled for five minutes, and placed in the dry case until required. The plan is not perfect and I have no doubt is capable of improvement, but it works fairly well with an intelligent private patient who can be made to understand the necessity of observing strict precautions. Unfortunately they are not all intelligent, and in the case of a hospital out-patient such a complicated plan is out of the question. The best that can be done is to start such people as well as possible and hope that by degrees they will acquire a certain amount of immunity against the toxins they are are bound to absorb. There is a little evidence to show that a certain degree of immunity may be acquired, but I am very skeptic as to its ever being sufficient in the face of a virulent growth, or when the bacterium coli is assisted by other germs such as the streptococcus and the proteus.

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SATURDAY, OCTOBER 15, 1898.

## STEREOCHEMISTRY AND VITALISM.

The sensational presidential address of Sir WILLIAM CROOKES at the late meeting of the British Association for the Advancement of Science, beginning with a prophecy of the failure of the world's wheat supply and ending with what seemed at least an endorsement of or expression of faith in the theories of telepathy, was, it appears, not the only utterance of scientific facts or possibilities that is especially noteworthy and exciting. The address of Professor JAPP of Aberdeen, in the Chemical Section, appears also to have at least stirred up comments, and forms the subject of a rather bilious editorial in the *London Saturday Review*. His subject, which has its interest to medical as well as to scientific readers and to cultured laymen, was the proof of a distinct vital agency or energy as afforded by the facts of stereochemistry, or by the optical effects of the molecular composition of substances. Many years ago PASTEUR, whose high standing as a chemist has been so eclipsed by his biologic researches that it has been forgotten, expressed the opinion that the molecular asymmetry of natural organic products was probably the characteristic that best established a natural line of demarcation between the chemistry of living and that of non-living matter. This molecular asymmetry is shown by the power these products have of turning the ray of polarized light to the left or right—a property which, according to Professor JAPP, is not shared by any inorganic substance in its natural states. So far as known, PASTEUR, it seems, never changed his views on this subject, and, according to the Scotch professor, modern chemistry has developed nothing to invalidate them. He, therefore, offers as a contribution to the literature of the vitalistic controversy a very elaborate discussion of the whole subject of the asymmetric arrangement of the atoms in the molecules of organic products, reviewing what investigations have been made, and coming to the conclusion that we have in this twisted or one-sided atomic disposition a distinguishing characteristic of natural compounds of vital origin. He finds as a result of all the data obtainable, that when the asymmetrically arranged atoms of which the inorganic world is composed are acted upon by symmetric forces in such a way as to produce asymmetric compounds, the constant result is either to form pairs of enantiomorphous molecules (those in which the asymmetry of one counteracts that of the other), or similar pairs of atomic groups within the molecule, and in either case the result is the same—mutual compensation and optic inactivity. The same, he holds, would be the case with symmetric matter interacting under the influence of asymmetric forces—supposing such to exist—provided that the latter are left to produce their effect unguided, and under conditions of pure chance. His own conclusion from it all, stated in his own words, is as follows: "The production of single asymmetric compounds or their isolation from the mixture of their enantiomorphs is, as PASTEUR firmly held, the prerogative of life. Only the living organism, with its asymmetric tissues, or the asymmetric products of the living organism, or the living intelligence with its conception of asymmetry, can produce this result. Only asymmetry can beget asymmetry."

It will be seen that the last of these three conditions of the formation of asymmetric compounds leaves a considerable margin of possibilities in chemic manipulation, and affords room for the possible synthetic production of any amount of organic substances. It would seem even to hint the possibility of a new origination of vitality: life producing life, not by direct propagation, but through the action of intelligence and intelligently directed manipulation of non-living matter. Admitting this would be, in some respects at least, a long step toward the position of the anti-vitalists. There is also some assumption, perhaps, in the statement that under no conditions of pure chance could an asymmetric compound be produced. As an argument for vitalism in its common acceptation, therefore, Professor JAPP's address is not absolutely complete or convincing, while it is an interesting contribution and shows up very prominently one of the distinctions that exist in nature between living and non-living matter and their respective products.

The anti-vitalists, however, are as dogmatic as, if not more so than, their opponents, and the temper of the editorial writer in the *Saturday Review* is an evidence of this. There is no reason why we should

accept his assumptions any more than those of anybody else; we need not admit it as beyond possible doubt that the disproof of spontaneous generation will be overthrown, or that all vital processes will be demonstrated to be mere chemic or physical ones. It is more scientific to wait the absolute proof of such views before accepting them as correct, and in the meantime we have many puzzling problems to solve before we can legitimately adopt them. If admitting that vital phenomena are yet in their essence beyond our comprehension and as yet unaccounted for by the known laws of matter, is accepting the theory of vitalism, then a vitalistic point of view is really the only scientific one to adopt.

## RENAL HEMATURIA.

Hematuria may occur in disease of any portion of the genito-urinary tract. It is usually considered that the farther removed the lesion from the meatus, the more intimately mixed the blood and urine, When renal affections are causative, then we meet with the best type of an intimately mixed fluid of blood and urine. While local conditions of the kidneys, as stone, new growth, parasites are responsible for many cases of what might be called renal hematuria, general pathologic systemic conditions must frequently be held to account. Such conditions as the latter occur in the various acute infections, in the anemias, in the hemorrhagic diathesis. Putting aside for the present the consideration of the above causes, there still remains a large number occurring for the most part in chronic rheumatic affections, in gout and in atheroma. This hematuria is explained by MUSSER as due to trauma. We know that in rheumatic disorders, in gout and in the various gastric and nervous complications attending these diseases urinary salts are excreted in excess. The excess of these salts explains the trauma on the grounds of mechanical irritation, and more or less blood appears in the urine. To be sure the hematuria thus resulting is as a rule microscopic, but is none the less a hematuria, and it might be said here the constant drain produced may partly account in not a few instances for the anemic condition observed in these diseases and especially in neurasthenic states. MUSSER, who has studied this question most closely, found in almost three thousand examinations of urine obtained from nearly two thousand patients, hematuria in 364 distinct individuals. "In 250 of the patients with hemorrhage the presence or absence of urinary salts was noted. Of these, in 90 uric acid alone was found; in 49 uric acid and other salts; in 17 oxalates alone; in 19 phosphates alone; in 4 oxalates and phosphates were found. In 71 it was stated there were no salts." He also states that the patients who were reported as without salts in their urine were afflicted with other disorders that readily explained the hematuria. In conclusion one other point established by MUSSER must be noted: that in all the patients in whom renal stone was diagnosed (and in whom time showed the diagnosis to be correct), blood, though often microscopic, was an almost constant ingredient of the urine in all instances.

## OUR PROSPECTS AS A PROFESSION.

It is so easy to prophesy evil, and easier still to believe it. From the days of Jonah and Jeremiah to those of Mother Shipton and the Millerites, men have been fatuously ready to believe the future big with portents of disaster. We appear to be morally certain of only two things: one that the world is, the other that it is soon coming to an end. We can not refuse to admit that the past has been triumphant, and the present fairly satisfactory, but the future! The "signs of the times," whether religious, political or professional, are invariably baleful, and we can not help believing that a little of this pessimism is tinging the vision of the prophets within our own ranks in respect to the future outlook of our profession.

Never was the outlook so gloomy, we are told; all the stars in their courses are fighting against us. First of all the profession is overcrowded already to the starvation point, and a flood of hungry graduates is poured into its ranks every spring. Then the dispensary abuse has reached such monstrous proportions that two-thirds of our population get their medical attention for nothing. Next to this is the evil of jealousy, and only charlatans can succeed. Finally—and most fatal of all—we are nobly but mistakenly destroying our own livelihood, sawing off the bough that supports us, by preventing disease so efficiently that ere long there will be none of it left for us to cure.

That there is some truth in every one of these allegations it would be foolish to deny, but that all of them together are competent to bring upon us half of the injurious results so freely prophesied is utterly unproven, and, we think, can be shown to be improbable. First of all, the general statement can be made in regard to all of them, that things are no worse in any of these regards now, than they were fifty or even a hundred years back, with the exception of the hospital and dispensary abuse. This is particularly true of the first count in the indictment. Two generations ago there was exactly the same cry about "overcrowding" that we hear today, and it has turned out just as it did in the celebrated case of MALTHUS. A century ago that renowned economist declared that our population was the root of all evil, and that the slightest increase upon the existing density would mean the ruin of the English race. Since then the population of the island has quadrupled, and instead of its condition having been made worse by the change, it is far better than ever before—less crime, less pauperism, longer lives, lower death-rate; more meat, sugar, fruit, etc., eaten per capita than ever before in history; more money in the small savings-banks; higher wages,

lower taxes, and our professional MALTHUSES have been equally stultified. So far from being ground down by competition into poverty and discredit, never was the doctor better paid, better equipped, better dressed and housed, and best of all, more respected and more trusted than he is today. If any one doubts the latter let him take one glance at the literature of the past century and a half and see what figure the doctor cuts in it. Previous to GEORGE ELLIOT'S "Lydgate" there is scarcely a medical man mentioned in English fiction or drama without a sneer or a slur; "the doctor" is invariably a pompous fool, a shrewd old ignoramus, or a whining cheat. Look at the fawning cads and impostors of SMOLLET, FIELDING, and MOLIERE, of DICKENS and THACKERAY, and contrast them with BALZAC'S medical hero, and with that highest compliment and noblest tribute ever paid our profession—"Maclure of Drumtochty," and whichever way we turn we find the same sort of contrast between now and then; in fact, it can be abundantly proven that the marked increase of the already "overcrowded" state of the profession in the past seventy years has been attended by no deterioration, but on the contrary, by a great improvement in our condition and status.

And the same contrast can be seen between different countries at the present day. In "density" of doctors, the United States heads the list with one to every 600 of her population; then comes England with about one to 1800, then Germany with one to 4000, and finally, Russia with one to 7000, and Turkey with one to 9000. If "crowding" is what we are most to dread, the position of the Turkish doctor ought to be the best in Europe, but as a matter of fact, it is the worst. And our Russian *confrère* comes next, both being wretchedly paid, and not infrequently mobbed or murdered by the populace during an epidemic. In fact, the paradox is absolutely true that the world over, the smaller the doctor's clientèle the better he is respected. Doctors are an index to civilization, and the more of them there are, the higher in the scale the country is, and the better off in every way. There may possibly be a relative proportion of doctors so high as to be injurious both to the community and to each other, but it certainly never has yet been reached in actual experience, and we can not even say how high it would have to be. Certain it is that six hundred intelligent, soap-using, civilized Anglo-Saxons profitably occupy more of a physician's time and thought than six thousand filthy Russian *Moujiks* or nine thousand Turkish peasants, or four thousand German *Bauern*.

And it is quite possible that the physician of the future, who has more than three hundred souls in the aggregate of his family will find himself overcrowded. Judging alone by the hard facts of experience hitherto, "overcrowding" of the profession is as pure a bug-bear as "overpopulation" *a la* MALTHUS.

Next, as to the dispensary abuse and loss of legitimate fees caused thereby: That this is an evil and a serious wrong alike to the profession and the laity is unquestionable, but that it has so far done any serious injury to the profession as a whole we utterly deny. In the first place, from the medical point of view, its injustice lies, not in robbing the profession of its financial dues, but in unequally and unfairly distributing those dues in the interests of the more "pushing" and dramatic individuals, at the expense of the more modest and less distinguished. There can be no question that it "pays" well on the whole and in the long run, or there would not be such an eager rush for positions of any sort upon its staff; and as the practice of medicine is supporting nearly twice as many physicians as ever before, it can hardly be fairly said that any considerable proportion of the profession is *absolutely* injured thereby, although it may be *relatively*. In spite of many striking and disgraceful exceptions, the vast majority of those who attend our dispensaries are so much "clear gain,' so to speak, to the profession, as they would otherwise never have employed *any doctor*, except the county or parish physician, either from ignorance, prejudice or unwillingness to pay the fee, and the formation of the "doctor habit" in these large classes is worth, financially, ten times as much to the profession as any possible loss of fees from the small percentage of really probable "pay patients" among them. This consideration is one which, we think, is hardly given its full value in discussing "hospitalism."

Even though 60 per cent. of the population of New York did come upon the lists of her free dispensaries in 1897, 90 per cent. of these would never have consulted a doctor, at all—one-third, for fear of the fee, depending upon household remedies, patent medicines or counter prescriptions; one-third, from sheer inertia or ignorant distrust, and the balance from absolute inability to even think of paying for anything not positively necessary to the continuance of their lives.

The first class object to calling a doctor, not so much from stinginess as from a sort of principle of economy—a feeling that it would be an extravagance, like butter with meat, or real cream in tea—and the only way to get them out of the notion is to give them practical experience of the saving of time, suffering and bottles of medicine, which comes from consulting a competent man at the start as to what medicine to take, instead of blindly blundering through three, six, or even twelve bottles of advertised cure-alls.

The second class is much larger than we can easily believe in this nineteenth century. The old, ignorant distrust, and even dread of doctors, has by no means died out of our communities. We are often painfully surprised to find the strong undercurrent of suspicion of the motives of "you doctor fellers,"

which sweeps through the minds of all the less intelligent classes. We are gravely suspected of "experimenting" upon our patients, of "giving medicine to keep one sick," of rejoicing in the spread of epidemics, and even of such insanities as hastening the end of hospital patients to get their bodies for dissection, or of performing gruesome operations for the purpose of securing certain portions of the viscera to use in making medicine. The celebrated "Whitechapel murders" were firmly believed, in the locality itself, to be the work of a doctor who was determined to have fresh, human kidneys for some such purpose, and this precious theory was actually exploited in some of the daily papers, whose sapient reporters declared that the shocking mutilations of the victims was evidently the work of a "surgical hand."

In short, both these large classes of the community have to be educated up to using the doctor, as they have to take a weekly bath, and their reluctance is due to something the same queer mixture of economy and distrust in both cases.

With all its abuses, the free dispensary has done and is doing us yeoman service with these large masses of the laity, teaching them by actual experience that the doctor is a necessity instead of a luxury, a good investment instead of an extravagance, a true and valiant friend instead of an enemy and a heartless *exploiteur*.

Last of all, what of the danger that by our vigorous and successful championship of sanitary reforms—a championship whose sincerity and devotedness not even our enemies have ventured to impeach—we are actually closing our own field of labor, destroying our own hopes of a livelihood? It need hardly be said that we are not raising this question with any reference to the advisability of continuing such a course of conduct. Any such suggestion would be even more futile, thank God, than contemptible, for we are unalterably pledged to mortal and relentless warfare against disease and pain in every form, and by every weapon suggested alike by our ancestry and our interest as physicians and as men. And even should such a course ultimately result in the complete extinction of our craft from lack of occupation, we would be the first to hail the event as a blessing to humanity and seek other less saddening and certainly not more arduous occupations.

The question simply is: Do the sacrifice and laborious services of the physician in behalf of the public health result in impairing his own chances of earning an honorable and adequate livelihood? If we put the query in the past tense it answers itself at once. As everyone at all familiar with vital statistics knows, the number of physicians supported by any country and the adequacy of their support is in exactly inverse ratio to the mortality and morbidity rate, from Turkey with its one physician to 9000 and its death-rate of 70 per 1000 per annum; Russia with 1 in 7000 and a death-rate at 50 per annum, up to England with her 1 to 2000 and death-rate of 16, and the United States with 1 to 600 and a death-rate in some cities as low as 9. In fact, paradoxical as the statement may appear, the countries which have the most sickness support fewest doctors, and vice versa, those which have most doctors have least sickness.

Nowhere have sanitary measures diminished the demand for physicians one iota, but rather, the higher the standard of health has risen, the keener the request has become for that most efficient and only agent for its attainment—the family physician. Instead of being in danger of extinction he is barely at the threshold of his full usefulness to the human race. A very large proportion of even our most highly civilized communities avail themselves but little of the services of the doctor save in mortal or serious illness. The realm of what might be termed "personal preventive medicine" is only just opening up to us. Get rid of the old and irrational method of summoning us only in disease and too often long after hopeless mischief is done, and let us be engaged by annual compact to keep our families in health, instead of simply curing them more or less imperfectly when ill, and we could profitably devote our entire time to the care of less than half the clientèle which at present we are attempting to care for, and the benefit to the race would be enormous.

Contrary to popular impression and legend, the race is improving physically every century, and men's standards of health are rising just as their standards of living and of morals are. The more efficient our sanitary precautions and the wider the spread of hygienic knowledge among the people, the higher and more exacting does this standard become. The intelligent Englishman and American of today would be no more satisfied with the standards of health, comfort and bodily efficiency of the citizen of the Middle Ages than he would with the latter's rancid undergarments, stinking floors, unglazed windows and filthy streets. What his ancestor called a trifling running of the nose or huskiness of the voice, and expected to put up with his life long, he dubs "catarrh," and insists on having it cured. A deformed arm or leg, instead of being endured as a dispensation of Providence, must be cured or else amputated and a rubber one substituted; his sight must be perfect and his head free from aches, or lenses are at once demanded, and so on all along the line. It is not that disease has increased—far from it—but our toleration of it and of discomfort or inefficiency in any form has greatly diminished.

So that while, three generations ago, there was simply one doctor in the town or even county—to be called, with the priest, only in cases of mortal urgency—there are now ten family advisers and a dozen specialists of every sort needed to meet the higher demands of the community for "Health, more

Health." And when we further remember the numerous official avenues of usefulness which sanitary progress has opened up to physicians—such as that of health officer, the board of health, the sanitary inspector of factories, of mines, of schools, the railroad surgeon, the insurance examiner, the food inspector and a score of others—we can readily see not only why the diminution of endemic disease has not limited the field of activity of our profession in any way, but on the contrary, immensely widened it, but also that there is no prospect of its doing so for generations to come. Half of our present membership could be profitably employed in studying and supervising our schools and systems of education alone, and in less than a generation more the school physician will be considered as necessary as the teacher or superintendent.

In fine, our ideals already rise faster than our attainments, in hygiene as elsewhere, and there will ever be a broad field for honest, conscientious workers who are willing to assist in their realizations. Our prospects as a profession were never brighter and more hopeful than they are today.

## MEDICAL SIGNERS OF THE DECLARATION OF INDEPENDENCE.

A recent article in a magazine has claimed that the vast majority of the cultured people of what are now the United States were opposed to the movement for independence from Great Britain. It is difficult to see on what data this claim is based, since a fair estimate of the position of people of culture can be formed from their number in the Congress which drew up the Declaration of Independence. A decided majority of the signers not only had what would now be a high school education, including Greek and Latin, but several were prominent in the science and literature of the time. Many graduates of universities were elected to and took part in the formation of the Declaration of Independence. Five were physicians, not only prominent in public affairs but in science and general literature as well. Drs. JOSIAH BARTLETT, MATTHEW THORNTON, OLIVER WOLCOTT, BENJAMIN RUSH, and LYMAN HALL, were five physicians who signed the Declaration. Dr. JOSIAH BARTLETT was a descendant of an English family, whose founder had entered England with William the Conqueror and had been ennobled by him. The founder of the American family settled in Massachusetts in the 17th century. Dr. JOSIAH BARTLETT was born in Amesbury, in November, 1729. Albeit, not a college-bred man, he became an excellent Greek and Latin scholar. The literature of these languages remained a favorite study until the close of his career. At sixteen he began the study of medicine, as an apprentice of Dr. ORDWAY, a distant relative of the family. This apprentice system prevailed in New England until the beginning of the 19th century. After the completion of his medical studies he settled at Kingston, N. H., as a practitioner. He gained a reputation even beyond the bounds of the State for his success in the treatment of malignant diphtheria, then called "black canker." The treatment he adopted in this disease was practically that of the present day, other than the orrhotherapy. He employed local anesthetics, chiefly essential oils, and mecurials. The patient at the same time was supported by nourishment in fluid form and stimulants. As the BARTLETTS had imbibed the republican principles of the English Puritans, who founded the British commonwealth, it was but natural that one of their scions should take an early stand for representative government. The standing of Dr. BARTLETT in the community is shown in his appointment as a civil magistrate, and as a colonel of a regiment of provincial militia, by the royalist governor, BENNING WENTWORTH. In 1765, Dr. BARTLETT was elected a member of the provincial legislature. He was foremost in the opposition to the corrupt, tyrannic system pursued by Governor WENTWORTH. In violation of the principles on which New Hampshire had been settled, and in violation of the religious rights of the settlers (the vast majority of whom were Puritans), Governor WENTWORTH attempted to establish a State church. In the endowment of this he reserved lands belonging to the public. Foremost in opposition to such procedures was Dr. BARTLETT, who, in 1774, led the movement to choose delegates for the Continental Congress, which met in September 1774. Dr. BARTLETT was chosen a delegate thereto, but was unable to attend, on account of his house having been destroyed by fire. Because of his movement against British tyranny, Dr. BARTLETT was dismissed from his military command and his commission as a magistrate annulled. In August, 1775, he was chosen a member of the Continental Congress, and was foremost in its deliberations. In 1776, being reelected, he became a member of the committee which devised the articles of confederation, under which the United States were ruled until the adoption of the Federal constitution, in 1788. After the Declaration of Independence had been discussed and was laid before the Congress for adoption, Dr. BARTLETT was the first to vote for, and the second to sign it. JOHN HANCOCK, being president of the Congress, first signed the document. In 1777 he was reelected to congress, but was unable to attend, because of ill health. In 1779 he was elected chief justice of the court of common pleas, and was also made mustermaster of the troops then being mustered in for the continental service. In 1788 he became a judge of the state court. In 1788 he was promoted to the office of chief justice of the supreme court. He was an influential advocate of the federal constitution in the convention of New Hampshire. In 1788, when that went into operation, he was elected a senator in the first Congress under it, but declined. In 1790 he was chosen president of New

Hampshire. In 1793 he was elected first governor of the State. He remained in office one year and then resigned. Dr. BARTLETT'S interest in public affairs did not conflict with his interest in science. He was prominent among the physicians who early began the movement which was to result in a pharmacopeia for the United States. He took a wide interest in the literature of the time and was familiar with the leading Greek, Latin and English classics.

No less prominent in New Hampshire was Dr. MATTHEW THORNTON. He was born in the North of Ireland in 1744 but came to the United States when three years old, where he was given an academic education. He was apprenticed after this to Dr. GROUT of Leicester, N. H. On the completion of his apprenticeship he settled at Londonderry, N. H. Here he gained an extensive practice which was only interrupted by an appointment as surgeon during the French and Indian War. In 1775, when the royal government was subverted in New Hampshire, Dr. MATTHEW THORNTON was appointed president of the State. Like Dr. BARTLETT he was a judge and a colonel in the Colonial army. On the abdication of Governor WENTWORTH, Dr. THORNTON proceeded to organize the State in its relation to the coming war and the Continental Congress. He was elected a delegate to the Continental Congress. Although taking his seat in November, 1776, he was permitted to sign the Declaration of Independence adopted in the previous July. He lived to be 89 years old. After he had passed his eightieth year he was attacked by pertussis, which finally developed asthma, from which he suffered for several years.

Dr. OLIVER WOLCOTT (to whom the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION has previously devoted some little attention) was the descendant of a Puritan family which emigrated to New England in 1630. He was born Nov. 26, 1726, and was graduated at Yale College in 1741. When he left Yale he entered the army for the French and Indian War. Peace being declared, he returned to Connecticut and began the study of medicine with his brother, Dr. ALEXANDER WOLCOTT. Like many of the medical men of the time he was appointed a judge. He served in every capacity from a captain to a major-general. He was elected to the Continental Congress in 1776, signed the Declaration of Independence, and then returned to Connecticut, to take command of the militia destined for the defense in New York. He was elected Lieutenant-Governor of Connecticut in 1786. As the JOURNAL has already pointed out, he was one of the foremost financiers of his time. His ability in this particular was recognized by both HAMILTON and JEFFERSON; representatives of opposite financial schools which still exist.

Dr. BENJAMIN RUSH, the foremost American clinician of his time in every department of medicine, was the great-grandson of an officer of the British commonwealth. Dr. RUSH was born Dec. 24, 1745, at Berbery Pa. His widowed mother gave him an excellent English education and then placed him under her sister's husband, who qualified him for admission to college. He was graduated at Princeton in 1760. He subsequently began the study of medicine under Dr. REDMAN. After some time spent in this study he went abroad, spending two years in the British medical schools and one year in those of Paris. He was graduated as doctor in medicine by the University of Edinburgh. Dr. RUSH early became a prominent practitioner. He was associated during the first year of his practice with Drs. SHIPPEN, MORGAN, BOND and KUHN, then the leading professors in the medical college of Philadelphia. He seems to have had all the trials of the practitioner. He believed in the beneficial effects of running in debt, for in a letter to a young man about to study medicine he seriously advises him to run in debt, because he will thus be compelled to be more steady.

During the 1793 yellow fever epidemic RUSH showed the highest heroism possible to a physician. Philadelphia had become panic-stricken because of the widespread nature of the epidemic, vividly depicted by BROCKDEN BROWN in "Arthur Mervyn." The city was badly organized for sanitation. The public institutions were in the hands of a thievish crew compared with whom TWEED was an enlightened philanthropist. Under these circumstances it is hardly surprising that some medical men, despairing of doing anything to check the epidemic, should have fled to places of safety. Dr. RUSH, when many of the resident physicians had hastened from the scene of danger and left the inhabitants to seek for medical aid where they might, called some of his brethren and pupils together to consider the question of their duty in that urgent emergency. RUSH eloquently remarked:

When gentlemen entered into the medical profession they voluntarily assumed responsibilities and duties to society, which depended on them for aid in their necessities, that they were obliged conscientiously to perform. The present was a case in which the physicians of the city were bound in duty to remain at their posts, however dangerous they might apprehend it to be. The community were already justly alarmed. If it saw physicians fleeing from the danger, it would enhance their fears. Fear was one powerful predisposing cause of taking disease. In this instance it would produce the most baneful effects upon the sick by depressing their spirits and banishing the hope of recovery. It would most probably prove indirectly the cause of many deaths in that way, as well as by depriving the sick of the aid which they need, if the physicians sought their own safety by flying from the field. As for myself, I am determined to remain and render all the aid I can. I may fall a victim to the epidemic and so may you, gentlemen. But I prefer, since I am placed here by Divine Providence, to fall in performing my duty, if such must be the consequence of staying on the ground, rather than to secure my life by fleeing from

the post of duty alloted in the providence of God. I will remain if I remain alone.

He did remain in the city together with some of his noble-spirited pupils and a few medical brethren, and all labored uninterruptedly night and day for the benefit of his suffering and distressed fellow-citizens until he was attacked by the fever. Even then he did not remit in his labors, but according to his remaining strength, he prescribed for those gathered around his bed for counsel and advice. Some of his pupils fell victims to the disease while laboring to preserve the lives of others.

The first professorship held by Dr. RUSH was that of chemistry in the College of Philadelphia in 1769. In 1789 he became professor of the theory and practice of medicine in the same college. As a teacher of medicine (Dwight's "Lives of the Signers") his reputation was deservedly high and widely extended. He had many private pupils from the commencement of his practice. His public lectures as a professor in several chairs which he filled were the most popular of any delivered at that period in this country. His fame drew medical students to the school in Philadelphia from every part of the United States and some foreign countries. In the nine last years his private pupils amounted to fifty. In 1812 the class which attended his lectures numbered four hundred and thirty. During his professional life he gave instruction to more than two thousand pupils. From the ancestry of Dr. RUSH he could not be other than a Republican. He was prominent among those who roused the country by their writings. Albeit a man of a judicial mind, he was no fanatical hero-worshipper, since he did not spare even Washington in his criticisms. He was not an original member of Congress during the debates on independence. He, however, succeeded the men who retired from that Congress on their refusal to sign the Declaration. Although not elected until after July 4 he was permitted to sign the Declaration. In 1777 he was appointed by Congress, physician-general of the military hospitals for the Middle States. His criticisms on the generals of the army and the contractors were during this period as acrimonious as any that have appeared since. In company with Dr. TILTON of Delaware he took an active part in remodeling the commissary service of the militia, which under the British colonial system was as rotten as that of the British army during the Crimean war. It was in consequence of these efforts that the first pharmacopeia was published at Philadelphia in 1778 under the title: "Pharmacopœia simplicorum et efficaciorum in usum noscomii militaris, ad exercitum fœderatum Americæ civitatum pertinentis; hodiernæ nostræ inopiæ rerumque angustiis, feroci hostium sævitiæ, belloque crudelia ex inopinato patriæ nostræ illato debitis, maxime accommodata." He was prominent among those through whom the Federal Constitution was adopted. The standing of Dr. RUSH in literature and medicine has already been extensively discussed in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Dr. LYMAN HALL was born in Connecticut in 1731. He received a thorough classical and medical education. He emigrated from Connecticut to Sunbury, Ga., with a party of forty New England families. He had attained an extensive practice when the agitation anent taxation without representation broke out. He was foremost among those who took a part in organizing resistance to the exactions of the government of GEORGE III. It was with difficulty that Georgia was led into a union with the other colonies. Dr. HALL presented himself to the Continental Congress as a delegate from the Parish of St. John, the rest of Georgia declining to send representatives. He was admitted by Congress as a representative from Georgia, but voted only when votes were not taken by colonies. Four months later a delegation of five, including Dr. HALL, was elected by the colony of Georgia. In May, 1776, he was again elected delegate and took an active part in the debate on the Declaration of Independence. Like BARTLETT and RUSH, HALL was an excellent clinician and had a very clear literary style, of the Addison type, then dominant.

Beside the five physicians, the Congress which adopted the Declaration of Independence contained two great contributors to medical sciences. The greatness of both these men in statecraft and economics has caused their contributions to medicine to be ignored. It is seldom remembered that BENJAMIN FRANKLIN was one of the committee of the French Academy of Sciences which exposed the pretensions of MESMER anent the objective nature of hypnotism. Among this committee FRANKLIN'S opinion was justly valued. It is a singular illustration of the nature of FRANKLIN'S mind that he should have recognized that while many persons were benefited by sparks from the Leyden jar, still in the vast majority of these cases the influence of the mental defect was so demonstrable, that he was unwilling to see any but a mental effect in all cases. He took an active part in all sanitary movements during his time. The fame of THOMAS JEFFERSON as a statesman and as the founder of a party which still exists, has so overwhelmed his contributions to science that these are generally forgotten. He took a great interest in biology, and discovered a fossil sloth, named after him the "Megalonyx Jeffersonii." Through his efforts Dr. SEAMAN was largely aided in the introduction of vaccination into the United States. It is a singular illustration of the falsity of the personal liberty cant, through which the opponents of vaccination have obtained a seeming victory in Great Britain and Switzerland, that JEFFERSON, the greatest advocate of personal liberty who ever lived, should have regarded compulsory vaccination as within the police powers of the government, and should have written a most

enthusiastic, most appreciative, and most laudatory letter to JENNER after some years' trial of vaccination in Virginia. The logical nature of JEFFERSON'S mind, his deep regard for the rights of individuals, and his scientific acumen render this letter a most emphatic demonstration of the falsity of the anti-vaccination cant. As Dr. CALDWELL has shown (History of the American Declaration of Independence), every one of the fifty-six delegates who signed the Declaration of Independence were men of well-balanced and well-cultivated minds. Of them, two died of accidents in the prime of manhood. The other fifty-four averaged sixty-six and three-quarter years—an illustrious example of the influence of well-cultivated and regulated brains, WINSLOW remarks, in conferring longevity upon those who possess them. Several of these delegates lived beyond their eightieth and some of them to their ninetieth year. The medical members averaged seventy-one years each. The history of the Declaration of Independence, therefore, demonstrates that since the stream can not rise above its source, the cultured people of what are now the United States took an active part in establishing, permanently, the principles of constitutional liberty which the colonists had inherited from their English-speaking ancestors. This is further shown by the great proportion of physicians and scientists among the signers. When commercialism and demagoguery are dominant, the medical man is regarded as unfit for the "business" end of politics. When culture, common sense and public spirit without the plutocratic taint are uppermost, the physician always comes to the surface as an ideal representative.

### CLAUDIUS HENRY MASTIN, M.D.

CLAUDIUS HENRY MASTIN, M.D., University of Pennsylvania, 1849, died at Mobile, Ala., October 3, aged 72 years. He served as a surgeon in the Confederate Army and was a member of several scientific bodies.

In the death of Dr. MASTIN the medical profession has lost one of its most learned and active members. The American Surgical Association will miss him, and the Alumni Association of the University of Pennsylvania is deprived of one of the ablest and most efficient workers for the University. A loyal friend, a gentleman and a scholar, his life is now only a sweet memory, but his surviving friends will cherish it while they remain on earth as an undying possession.

## CORRESPONDENCE.

### Case of Fetal Monstrosity—Thoracopagus.

WEATHERLY, VA., Oct. 6, 1898.

*To the Editor:*—July 15, 1898, I was hastily summoned to the bedside of Mrs.——, a primapara, who presented the following history: She had been greatly molested by pains in the abdomen, principally during the night, for about a fortnight. During the night of July 15 she was startled by a sudden gush of liquids, which was none other than the amniotic fluid, and apprising her mother of what had happened, a messenger was sent for me. Arriving at her bedside I discovered her with severe intermittent pain, characteristic of labor. Washing and disinfecting my hands, I proceeded to make a digital examination to ascertain the cause, since the woman declared to be only six months pregnant. I found the os soft and dilatable and a fetal foot presenting.

Firmly grasping the presenting part I applied gentle traction, and presently I had what I presumed to be the mate to the foot presenting, but noticed the singularity of both feet facing each other. On high examination I was positively convinced that they were not members of the same body. My next procedure was to replace one foot and bring down the mate, but my efforts at this were futile. I however, brought down a third foot, and mating them, I attempted replacing the odd member back into the uterine cavity by gently pulling and simultaneously pushing back the one foot. No success in these manipulations, inasmuch as my pulling perceptibly affected the other foot. I now began to search cautiously for the missing fourth. This was not an easy task, because by this time the expulsive pains and efforts of the woman were very severe. After much patience I ultimately located it and succeeded in hooking my index finger around the groin, forcing it down. I must admit that I now had on hand an experiment which embarrassed me not a little, but gave no vent of it, so worked zealously on as my judgment suggested. Grasping the handful of feet with one hand while I busied the other in supporting the perineum and "shelling out" I had the two bodies down to the axilla. I now had the satisfaction to take *stock account*, as it were, and found that I had not only twins to deal with, but that they were closely joined together from the umbilicus on up as far as I could find. I shook off all remnants of perplexity at this point, knowing full well, however, that the problem was not solved. Gentle and patient manipulations delivered the arms and shoulders. As every accoucheur will readily perceive I now had arrived at the climax or trying point—to deliver the heads. This was accomplished with apparent ease. I gently rotated the bodies so as to present them obliquely, to have advantage of the largest diameter of the maternal pelvis. By external pressure and traction, and encouraging the woman to bear down forcibly, I had the satisfaction to feel the lower head yield, and by swinging the bodies forward at right angles to the woman it was soon in the sacral cavity, the other head following in the same manner. Rotating the bodies now so that one head should rest against the perineum, the other against the pubic arch, and still holding at right angles, the complete expulsion was ultimately effected, and this, without the use of an anesthetic, no damage to the soft parts. The placenta was delivered with ease, and the subsequent history of the case uneventful.

The placenta was normal in size—one common umbilical cord and near the placental insertion was a large clot of blood which had the appearance of being several days old, and undoubtedly created the pains and also precipitated the labor, as well as a providential interference to rectify a mistake of nature. Had the woman arrived at full term of gestation a difficult and serious labor would have been inevitable. Now a brief description of the product of this labor. The double monstrosity was $12\frac{3}{4}$ inches long and weighed six pounds. Both fetuses were well-developed and symmetrical, of the male sex, and united together along the sterni-clavicular articulation to the umbilicus. The possession of it was denied, much to my utter disappointment since I very much desired it. The union was very close, and not only tegumentary but evidently the two sterni were cemented together without any communication of the thoracic centers. They were dead *in utero* probably three or four days and showed evidences of maceration.

Playfair's work on Obstetrics quotes nineteen cases of similar ture but the presentations differed.

I have thus modestly recited my procedure and success in s rare case, and I report it not with a view of expecting to call th praise and admiration for terminating a case of such ex- ordinary character, but with a hope that by reporting this to professional fraternity some brother may escape the em- rassment which confronted me, as well as to be instructive the readers of this valuable JOURNAL as it has been to me.

W. P. LONG, M.D.

## Complete Congenital Separation of all the Bones of the Cranium.

FLORENCE, COLO., Oct. 8, 1898.

*To the Editor:*—Recently I attended a lady in confinement, o gave birth to female child at term—presenting such a re- arkable and unusual anomaly of osseous development—that erewith hand you the details, in brief, for publication. The tus presented by the occiput and nothing unusual was ob- rved till the head engaged in the vulvar outlet, when great obility was apparent to the touch. After delivery, which s normal—assisted by traction with the hand only—all the nial bones were found to be completely disunited at their tural lines. *Not one* was united with its fellow, and in the se of the frontal bone, the two halves were ununited as in ry early fetal life. No union anywhere had ever existed, though the individual bones were perfectly formed, and when ld in proper position in the hands, made a cranium of nor- al shape and size. In fact, after delivery of the head from e outlet, there was not much displacement with the head ng at rest, the bones seeming to be held in relatively proper sition by the connective tissue underlying the scalp. The alp itself was normal, not perforated or broken at any point, d manipulation of it gave the impression of a bag or sack ntaining separate bones loosely attached to its inner surface, hich was in fact the case. The fetus was dead, and from pearances had been so for several days. The mother felt motion" last about three days previous to the onset of labor, hich was slow and prolonged by reason of the conditions set rth.

There was nothing remarkable about any other portion of e osseous system; the child was well developed, and would, rhaps, have weighed eight or nine pounds. The parents are ealthy, and there is no history of any constitutional taint or yscrasia on either side. The mother has aborted twice—once at four and a half months, once at seven and a half—e only times, save this last, of pregnancy.

An interesting circumstance connected with the case is e fact that *each parent was a seven months' child.* What ole, if any, this circumstance may have played in the case, I ill not attempt to say. I was unable to procure the infant r dissection and preservation of specimen, much to my re- ret. In a careful search of all the literature at my disposal earing upon anomalies and monstrosities, I have been unable find a similar case, and in an experience of a quarter of a entury I have not before seen anything approaching it.

Since its rarity makes it extremely interesting, I publish it, oping that if any one else has seen a duplicate, he or she, ill do the same. Yours,

B. ROSEBERRY, M.D.

P. S.—The condition was not due to hydrocephalus.

## Disease of Intemperance.

NEWARK, N. J., Oct. 4.

*To the Editor:*—In your timely article on "The International emperance Congress," in the JOURNAL OF THE AMERICAN EDICAL ASSOCIATION (Oct. 1, 1898), you well say, "The ques- ions concerning the action of alcohol and inebriety and its cure nd prevention, are vital in almost every neighborhood of the land, and it would seem to be a most practical subject for medical men to discuss and study," for physicians pre-eminently possess the power to arrest and prevent the spread of the disease of intemperance. They alone can prohibit with authority the use of alcohol in the nursery, hospital and general practice, and so prevent the acquirement of the appetite for alcoholic drinks—slowly induced in some, in some more rapidly—which, Tantalus-like, torments and devours the sufferer with a perpetual thirst.

According to the best authority, experience has demonstrated it to be a fact that as regards the drink habit, the first step in an attempted reformation must be the removal of the appetite, and nothing will do this but an entire abstinence from its provocative and inducing causes.

Undoubtedly, opium and alcohol produce effects which differ, but they agree in this: that used habitually, they alike tend, by a law as constant as gravitation itself, to establish a tyranny compared with which chains, racks, dungeons and whatever else go to make up the material apparatus of the most *cruel* despotism are as nothing, for these are outside the man and leave the soul untouched.

Christianity is a principle not a law; Christianity is Christian love. This fulfills all claims, abstinence among the rest.

Respectfully,

J. ACKERMAN COLES, A.B., A.M., M.D.

## Hygiene of Music.

MINNEAPOLIS, MINN., Oct. 2, 1898.

*To the Editor:*—A medical friend having called my attention to your interesting article on "The Hygiene of Music," in your issue of September 24, I beg leave to offer a few suggestions in amplification of your remarks.

The question as to whether music appeals exclusively to the emotional appears to be mooted rather one-sidedly. In music, as in any other field of education, we do not make a sufficiently clear distinction between appreciation and creation. Waiving the discussion as to whether the excessive indulgence in either branch (I use this expression for want of a better one) must needs result detrimentally to the individual, I desire to call attention to the fact that when the intellect is to be employed, there is a vast difference between a mere indulgence in rendered music and the execution of music. Your esteemed colleague, the recently departed Dr. Billroth at Vienna, has left quite extensive notes on music, which were edited and partly published by Eduard Hauslick, the noted Vienna musical critic, in a little pamphlet under the title "Wer ist musikalisch?" (first published in the *Deutsche Rundschau*, Vol. xxii, Berlin). Among other interesting statements, Dr. Billroth emphasizes the fact that the practice of music draws upon the intellectual powers. To be sure, not in the degree required by the study of Greek, mathematics or the playing of chess, but nevertheless a sufficient call for intellectual activity. The student of music, says Billroth, must have "*die Frende an der Ueberwindung von Schwierigkerten*, that is, "the joy of overreaching difficulties." To this it might be answered that the riding of a bicycle requires the exercise of the same faculty, and yet this should not be called an intellectual employment. According to Gladstone (although an axiomatic truth independent of any authority), the safest recreation is a change of employment. Bicycle riding, it will be admitted, draws less upon the intellect than the solution of a mathematical problem, yet the powers of quick decision, discrimination, etc., are more or less needed in pushing your wheel through a crowded thoroughfare. Now, in practicing music, the same, and vastly more, is required. Let me take, for example, the study of the violin.

You will be told by the teacher or the books that you can never get a clear tone from the instrument, unless you hold the bow in an exact angle to the strings. The idea that you

can and must get it solely by repetition is now-a-days discarded by advanced teachers. They know that your hands and fingers are directed from the nerve centers in the brain, and accordingly they practice with the "head" and not with the "fingers." And, recurring for a moment to the bicycle. A tall, strappy Swede, whom I entrusted with the ennobling task of cleaning my office, remarked that he thought he had to give up the attempt to ride a wheel; "he would never get it." "I presume you are riding it with your legs and feet?" I queried. He looked foolish. "Well," I said, "you must ride it with your head."

The independence of the fingers in violin-playing is a matter of progressive education. The fingers of a violin artist are not more fit to exercise a particular employment, requiring dexterity of the fingers, than the fingers of a rapid stenographer or typewriter are for violin-playing. Even the much praised "limbering-up the fingers" is of but limited account in the handling of a musical instrument. "Cheiro," the palm reader, notwithstanding his charlatan platitudes, has it correctly when he asserts that pliable fingers are unfit for music, and that "educated fingers" are essential. The strict observance of the time (tact) in ensemble playing, certainly calls for intellectual alertness, quickness of perception, and independence of thought from mechanical labor. The trained musician reads half a dozen bars ahead while he is playing with "feeling" (natural or artificial), and at the same time watches the baton of the leader.

Another very important function in connection with musical execution is the memorizing of music pieces. This is now done by impressing the image of the musical characters (notes, etc.), upon the mind, against the obsolete method of thoughtless repetition. The great German violinist, Burmeister, some time ago, performed the feat of memorizing a new, difficult piece while riding in a railroad car, by looking it a few times over. He played the bulky concert from memory without missing a single note, or the prescribed shades of forte, piano, etc., so brilliantly that the uninitiated would have sworn this to be the result of mastery gained by many trying repetitions.

ARTHUR L. HERMANN.
Counselor-at-Law.

## A Defense of Dr. Huidekoper.

WOODBURY, N. J., Oct. 6, 1898.

*To the Editor:*—In the *Medical Record* of Oct. 1, 1898, there is a short editorial *in re* Prof. Rush Shippen Huidekoper, that is so unjust to the man, so absolutely devoid of that *camaraderie* usually characterizing the intercourse of medical men that I ask space to reply to it. *It should be all sufficient for a writer in a journal supported by doctors that a man holds a diploma from a reputable school and is himself in good professsonal standing.* That he has devoted a number of years to the study and teaching of comparative medicine should not, I take it, be a bar, but rather a recommendation, for any preferment to which he may aspire, or which (as in this case) may be tendered to him. These ethics of the *Medical Record* are the ethics of "kites and crows," and should be promptly and unmistakably disavowed by the profession. If the only objection to Dr. Huidekoper lies in his title of M.V. Alfort, it would not perhaps be unwise for more of his profession to improve their minds by the attainment of a like disqualification. Respectfully, T. B. ROGERS, D.V.S.

# SOCIETY NEWS.

**American Academy of Railway Surgeons.**—The following officers were elected for the ensuing year: President, W. W. Grant, Denver; first vice-president, T. F. Pritchard, Manitowoc, Wis.; second vice-president, J. P. Lord, Omaha; secretary, T. B. Lacey, Council Bluffs, Iowa; treasurer, C. B. Kibl... Corry, Pa.; editor, Fred J. Hodges, Ashland, Wis. Place ... holding the next meeting, Omaha, October, 1899. Committee of arrangements: J. P. Lord, chairman; T. B. Lacey and Fred J. Hodges.

**Western Surgical and Gynecological Association.**—The eighth annual meeting of this Association will be held at Omaha Dec. 28 and 29, 1898. The local Committee of Arrangements in Omaha is actively preparing for the entertainment and comfort of those who attend. Surgeons and gynecologists, and those interested in the progress of these specialties, are cordially invited to affiliate themselves with us. The secretary will be glad to send application blanks. Titles of papers should be sent to the secretary as soon as possible, but not later than November 20 to insure a place on the program. Geo. H. Simmons, Secretary, Lincoln, Neb.

**Association of "Big 4" Railway Surgeons.**—The next meeting of this Association will be held in Cincinnati, November 10. The program includes the following papers:

The Diagnosis and Treatment of Lumbago and Back Sprain, J. Schneck, Mt. Carmel, Ill.

The Surgical Consideration of Shock and Its Treatment, A. Rhu, Marion, Ohio.

The Value of the Hot-water Bath in Surgery, T. P. Satterwhite, Louisville.

Address of President, L. E. Russel, Springfield, Ohio.

The best Method for Examining the Eyes and Ears of Applicants for Admission to the Railway Service, C. W. Tangeman, Cincinnati.

The Care of Head Injuries, Webb J. Kelley, Galion, Ohio.

Report of a Case of Brain Injury, T. J. Whitton, Nokomis, Ill.

The Railway Surgeon and the Company, Geo. M. Waters, Columbus, Ohio.

Hemorrhoids and Their Treatment in Railroad Employes, T. M. Kyle, Aurora, Ind.

Anesthetics—How to Minimize the Danger of Their Use, E. H. Hyatt, Delaware, Ohio.

**San Francisco Medico-Chirurgical Society.**—At the meeting for October, Dr. Rigdon gave a very interesting demonstration of the instrument devised by M. L. Harris of Chicago (vide JOURNAL, Vol. xxx, p. 236) for obtaining the urine from either kidney, unmixed. The apparatus, as is well known, consists of a double catheter of special form and construction, and of a second instrument, to be introduced into the rectum in men or the vagina in women, so formed that when in place it will make a ridge along the longitudinal diameter of the bladder. The two parts of the catheter are then rotated downward so that one section is on either side of the ridge thus formed. If the bladder has been evacuated and washed before the introduction of the catheters, the urine will be drawn from the two sides unmixed, and the condition of the secretion of the two kidneys may then be compared. After calling attention to the often almost vital importance of being able to thus differentiate the two kidneys, as to the character of their secretion, Dr. Rigdon introduced a patient and proceeded to demonstrate the facility with which the instrument could be introduced and the urine obtained. The greatest advantage which this apparatus possesses is that it may be used by any one not equipped with the great manual dexterity required for operating the cystoscope, and also this apparatus may be used in cases where the cystoscope is not available, on account of the abnormal position of the ureters or from profuse hemorrhage or some similar reason. The bladder being empty, great care must be exercised in rotating the two catheters after their introduction into the bladder, for the reason that it is very easy to injure the bladder walls. The demonstration was eminently satisfactory, and the members present were able to see for themselves both the ease of introduction and the rapid

y with which the secretion of the two kidneys could be obtained and examined. The patient complained of no pain or distress and seemed not to object in the slightest to the manipulation. The curious fact was noted by several of the members that the rate of secretion did not appear to be the same for both kidneys, the right secreting more urine in the time of observation than the left. Dr. Rigdon expressed it as his opinion that this difference was more apparent than real, as he had noticed that in the course of a little time the other side would in turn secrete more and thus keep the two sides about the same. Dr. F. B. Carpenter suggested that an enlarged prostate might interfere with the proper adjustment of the curved catheters and thus prevent the proper application of the apparatus. Dr. Lane, in discussion, said that he was personally acquainted with two cases where the wrong kidney had been removed by mistake; one of the cases he had himself operated on, and in the second case he had been present at the operation; he therefore called attention to the great importance of differentiating the two kidneys in cases where there was evidently kidney disease but where the exact location of the affected kidney could not be ascertained by palpation or examination. It was his opinion that the device under discussion promised well, and he would await further reports as to its efficiency in actual practice, with much hope for favorable reports.

## PUBLIC HEALTH.

**Tropon.**—This new cheap preparation of albumin, recommended as food for the masses (vide JOURNAL, xxx, 1304), is warmly endorsed by D. Finkler of Bonn, after long and extensive tests. It contains almost pure albumin, is well absorbed, and can be taken for months, even years, in various ways.—*Munich Med. Woch.*, August 23.

**Hygiene for Children.**—The recent death of an eight months' child whose head was caught between the side-bars of its iron crib, suggests the necessity of furniture better adapted to children. How many unnecessary injuries would be avoided if for instance, sideboards, commodes, etc., were made with rounded instead of sharp corners!—*Gaz. Méd. de Paris.*

**Culinary Bacteriology.**—Jäger of Königsberg has been delivering a popular course of lectures on hygiene and bacteriology, in which he has applied laboratory methods to culinary matters and processes. His jars with cotton stoppers like culture tubes, filled with cooked and uncooked meats, etc., kept unspoiled from five to fifteen days in the warm hall.—*Journal de Hygiene*, September 15.

**Albumose Milk.**—A cheap and easily prepared modification of milk for infants has been prepared at the Göttingen University clinic, which has produced excellent results in the infants fed with it to date. It is based on the fact that albumose will hold casein in an emulsion and cause it to be precipitated in fine flakes, very much increasing its digestibility. They dilute cow's milk with water, add cream and sugar of milk, and finally a certain amount of caseose (casein-albumose), according to age of the child.—*Deutsche Med. Woch.*, August 11.

**Alcoholism in Russia.**—According to the *Progrès Médicale* of September 17, the authorities of the city of St. Petersburg have suppressed the 25,000 saloons where alcohol was sold, and established in their place 5000 shops under their control, scattered a certain distance apart all over the city. The alcohol is all tested and sold in bottles of a certain size, not large, sealed with a government stamp. No one can purchase more than one bottle at a time in one of these shops and he must walk a considerable distance before he can obtain another, which is absolutely refused him if he shows the slightest indication of drunkenness.

**Parasites in Game.**—Megnin reported recently to the Paris Académie de Médicine that he had noted an epidemic among pheasants last year, caused by a tenia, and that he has found the same parasite again in partridges this year. His investigations were made at Gueville where the game is raised in large numbers, and over 300 died last year. He therefore names the tenia, Davainea Guevillensis, as it differs from the others known. The *Bulletin*, September 13, contains descriptive cuts. The parasite obstructs the intestines by its size and numbers, hundreds often being found in one bird.

**High Mortality in Chili.**—We notice in an article on the sanitation of Santiago in the *Revista Chilena*, that the death-rate in Chili from 1885 to 1889 was 30.3 per thousand, and from 1892 to 1896, 31.2. The number of illegitimate births is also high; in England the proportion is 1 to 13, while in Chili it is 1 to 3, and during the first quarter of the present year, 1 to 1.3. The natality is larger than in other countries; 45 per thousand; in Germany it is 40; England, 36 and France, 26. The infant mortality is correspondingly high; 37.74 per cent. in Santiago.

**Contagion Among Nurses.**—Cornet states that two-thirds of the members of the religious sisterhoods who work among the sick, die of tuberculosis. . . . Rumpel reports 114 cases of disease with 10 deaths, among the 300 nurses employed in the Hamburg hospitals, and 43 deaths among the 2349 nurses in the eighteen Red Cross hospitals in Germany; seven from typhus and sixteen from other infective diseases, during the last three years. The total number of cases of disease acquired professionally amounted to 640, including 56 cases of typhus, 53 of diphtheria, 15 of scarlet fever, 6 of measles, 20 of wound infection and 118 of various forms of angina.—*Vienna klin. Woch.*, September 15.

**International Quarantine Service in Egypt.**—This service, established by the International Health Convention at Venice in 1892, now comprises an inspector-general with a salary of $3,000 to $3,600; seven superintendents of the sanitary stations: Alexandria, Port Said, Suez, Tor, Damietta, Souakim and Kosseir. The salary of the first four is $2,400 to $3000; of the rest $1,200 to $1,500. The Tor station is not occupied except during an epidemic, the incumbent residing at Alexandria. Besides these there are six quarantine officers with a salary of $1,600 to $2,400, with an indemnity when they are sent to Tor. A laboratory for bacteriologic research has been established at Suez, and all the members of the service must be thoroughly trained and experienced in medicine and practical bacteriology with a knowledge of French, German and English at least. The various nations interested are all represented, France with four, which includes the inspector-general.—*Presse Méd.*, September 14.

**Yellow Fever.**—According to press dispatches since our last report (vide JOURNAL, p. 868), the conditions in the South are as follows: The total cases number 465 in Louisiana for the summer, with 30 deaths, and 351 cases in Mississippi with 35 deaths, 44 cases occurring in Jackson from September 27 to October 8. In Louisiana the distribution of cases reported to October 8 has been: New Orleans, 62 cases, 11 deaths; Harvey's Canal, 14 cases, 3 deaths; Franklin, 210 cases, 7 deaths; Wilson, 247 cases, 4 deaths; Baton Rouge, 22 cases, 2 deaths; Houma, 8 cases, 1 death; Clinton, 2 cases; Plaquemin, 3 cases; Jackson, 22 cases; Bowie, 1 case.

In the following parishes (outside of towns above mentioned) cases were reported: Iberville parish, St. Charles parish, St. James parish, East Feliciana parish, West Feliciana parish, Rapiden parish (Alexandria), East Baton Rouge parish. On October 8, Hattersburg, Miss., reported 20 new cases; Jackson, 10; Natchez, 2; Madison, 3; Starkville, 1; Fayette, 2; Hermanville, 1; Taylor's Station, 1; Harriston, 1; Oxford, 2 and 1 death. The reports for October 9 add Poplarville, Miss.,

with 2 new cases; Lumberton, 2; and 7 new cases at Jackson. October 10 reports give: Canton, Miss., 3 new cases; Crystal Springs, 2; Waveland, 3; all towns hitherto uninfected.

**Smallpox in a Summer Hotel.**—It is not a pleasant event for a busy summer hotel to have to shut up in August or September, on account of an infectious disease among its guests or servants; especially so when the proprietor knows or is told that the trouble and loss might easily have been prevented. This remark applies with special force to smallpox. Why would it not be a good standing rule for hotel people to refuse to employ waiters and helpers who have not the evidence of a recent and successful vaccination? The recent experience at a large house, accommodating several hundreds of guests, recites the old, old story of the first cases of variola being mistaken for varicella. The mistake corrected itself, after a short delay, and this correction emptied the house. Fortunately every effort was made to prevent the spread of chicken-pox, while the disease was yet thought to be of that nature, but not soon enough to prevent exposures, in greater or less numbers. Late in August the correct diagnosis was made and the usual preventive measures begun. There were several hundred guests at the hotel, on August 28, who left on that day, scattering to the four points of the compass. Twenty-six cases of the disease, all among the servants of the house, were reported. Of these twenty-one were among the colored help, and nearly all of these hailed from Asheville, N. C., in which State not a few cases of smallpox have occurred since January last. There was one death. The hotel was closed and no new cases have been reported since the quarantine was established. Hotel reputations are so susceptible of lasting injury that their proprietors can ill afford to take unnecessary risks about smallpox among their employees. They may with especial propriety keep a sharp lookout as to servants coming from those Southern states where a smallpox is known to exist and where sanitary boards have but little preventive authority. It is almost as important for hotel servants to be well protected by vaccination as for nurses, barbers, and railroad employees.

## NECROLOGY.

DEATHS ABROAD.—Professor Crocq of Brussels, in his seventy-fifth year, who has so ably represented Belgium in international gatherings and scientific achievements; founder of the *Presse Méd. Belge.*; president of the Federation Méd. Belge; appointed professor in 1855; author of numerous articles: "Lead Acetate in Pneumonia," "Study of the Penetration of Solid Particles Through the Tissues," "Application of Auscultation and Percussion to the Horse," "Treatment of Tuberculosis," etc.——F. Malanco, Mexico, a prominent physician, founder of the *Medicina Científica*, and a frequent contributor to other Mexican exchanges.

HERMAN S. BEAHAN, M.D., Rochester, N. Y., October 2.——F. P. Bibby, M.D., Coffeeville, Miss., September 27.——J. F. Boyce, M.D., Santa Rosa, Cal., September 30.——John Burnett, M.D., Scranton, Pa., September 30.——J. B. Curtis, M.D., Somerville, Mass., October 2, aged 31 years.——Hubert D. Ensign, M.D., Boone, Iowa, October 2, aged 55 years.——J. C. Herrick, M.D., Denver, Colo., September 30, aged 54 years.——W. F. McLean, M.D., Elyria, Ohio, October 5, aged 65 years.——S. B. H. Nichols, M.D., Corning, N. Y., September 30, aged 63 years.——James L. Ord, M.D., Washington, D. C., October 3, aged 75 years.——D. L. Paine, M.D., Oregon City, Ore., September 30, aged 55 years.——R. R. Ruff, M.D., Pitnam, Ark., September 21, aged 67 years.——C. H. Sevier, M.D., Brownsville, Tenn., September 30, aged 59 years.——D. W. Whittaker, M.D., Chattanooga, Tenn., October 3, aged 47 years.

## MISCELLANY.

**Personal.**—Dr. Norval H. Pierce has resumed his practice, at 31 Washington St., Chicago.

Dr. Michael Foster, who has just been elected president of the British Association for the Advancement of Science, has been professor of physiology at Cambridge since 1883. He will assume office next year, at the meeting in Dover. Sir William Crookes, occupant of the chair this year, is a chemist; his immediate predecessor, Sir William Evans, is an archæologist, while Lord Lister was president in 1896.

**Requirements for the Practice of Medicine.**—We have received from Secretary Egan, advance copy of that portion of the annual report of the Illinois State Board of Health, relating to the legal requirements for the practice of medicine in the different parts of the United States, including the territory of Hawaii. Its completeness is creditable to the energetic secretary.

**Higher Standard for Dentists.**—The Association of German Dentists passed resolutions at its recent annual meeting at Eisenach, urging the authorities to require higher educational attainments of students of dentistry, and a longer course in the university, raising the standard from the certificate of the first grade in the "gymnasium," as at present, to the diploma of a "gymnasium" or "real gymnasium" (high school).—*Munich Med. Woch.*, August 23.

**Science Reveals Nature's Beauty.**—In his presidential address before the British Association, Sir William Crookes speaks thus brightly to those who are, with him, engaged in wresting the hidden secrets from nature: "Steadily, unflinchingly, we strive to pierce the inmost heart of nature, from what she is to re-construct what she has been, and to prophesy what she shall yet be. Veil after veil we have lifted, and her face grows more beautiful, august and wonderful, with every barrier that is withdrawn."

**Railway Casualties in 1897.**—In the year which ended June 30, 1897, 6437 passengers on American railways were killed in accidents, and 36,731 were injured. A *New York Times* writer, with an arithmetic bent, has figured that only one out of 2,204,708 of the whole number of passengers carried was killed outright, and only one out of 175,115 injured. With the total mileage as a basis, the statician figures that the traveler with average luck escapes injury until his journeyings amount to 4,385,309 miles, and not until his score is 55,211,440 miles is it his turn to get killed. Traveling 30 miles a day, 300 days in the year, no one need begin to worry until he is 5,467 years old.

**Rush Medical College.**—Upon the first year of its affiliation with the University of Chicago Rush Medical College starts out with a class of over 700 students. This is especially gratifying to its friends as it shows that physicians and students throughout the country favor higher medical education and appreciate the rigid requirements that are now being enforced. As a result of the demands for ample preliminary education, many men have been shut out of the Freshman class, and the policy of sifting out the poorer men from the other classes has elevated the grade of those already in the college. After the examinations at the close of the last term, eighty men were notified that they could not advance to the higher classes unless their scholarship could be brought up during the summer months. Many of these have dropped out of the college. Thirty have been required to take the work of the previous year over again, and the remainder have been given until the fifteenth of November to try to make up their deficiencies, at which time, unless they can remove the conditions, they, too, will be remanded to the lower classes.

**Oidomycosis.**—Besides bacterial infection and infection from the streptothrix, we must now make a place for infection from pathogenic blastomycetes, which has been experimentally and clinically established. The best known of this group is the saccharomyces albicans, which usually is content to vegetate on a mucosa, but occasionally invades the entire organism and produces a fatal disease. Busse reported a case of chronic pyemia caused by a saccharomyces, which produced similar

sions experimentally. Curtis also has reported the case of myxosarcoma of the thigh, containing a yeast fungus, and such cases are multiplying. H. Roger contributes an article to the *Presse Méd.* of August 24, describing the lesions produced by rabbits inoculated with the oidium. The granulations invaded the entire organism, and caused hypertrophy of the kidneys, etc. (*vide* JOURNAL, pages 199 and 417).

**Primary Tuberculosis of the Kidneys.**—In Professor Israel's operations on the kidneys 10 per cent. have been on account of tuberculosis, and in sixteen out of twenty-one it was evidently a primary affection. He has found it more frequent in women than in men, and unilateral in chronic cases. He removed the entire organ in twenty cases. Three died from the immediate results of the operation; five deaths occurred later, after partial or complete recovery. In regard to the final results: Three of the uncomplicated cases died, but the remaining six were permanently restored to health (observations dating from nine years). None of the cases with complications were cured, although some were benefited to a remarkable extent. He advises an early operation in simple primary tuberculosis, or if the bladder is but slightly involved. He does not operate in secondary ascending tuberculosis, unless to relieve serious disturbances.—*Vienna klin. Woch.*, September 15.

**Neuralgia.**—A. Eulenburg contributes a study of the pathology and therapeutics of neuralgia to the *Berlin Klin. Woch.*, No. 33. He does not consider it a definite disease of the peripheral nerves, but attributes it to morbid conditions in the nerve-cells, determined by various primary affections of the peripheral sensory neurons. Essential neuralgia is distinguished by the characteristic attacks of pain, with intermissions and spots painful to pressure. Excentric, that is, neuralgia affecting the roots and root-fibers, is characterized by the brevity of the attacks, lancinating pains, while in topic peripheral algias the pain is generally continuous, and there are no especial paroxysms. He separates hemicrania from the neuralgias, and also asserts that what is called intercostal neuralgia is due to entirely different processes. Many cases of ischias, he states, proceed from acute or subacute localized perineuritis of the ischiadicus, propagated *per continuitatem* by the lumbar muscles or primarily affected nerves. He frequently arrests and cures ischias with deep injections of 2 per cent. carbolic solution.—*Munich Med. Woch.*

**Ano-rectal Actinomycosis.**—This is a rare affection, with only seven cases on record. Poncet described another observation recently, illustrating his remarks with color photographs, the first application to pathology of the new photography of colors, which "opens a new field for medical iconography." The bladder was secondarily affected, with numerous calculi, some containing fragments of wheat grains—the patient confessed to having inserted a head of wheat in the urethra. The ano-rectal lesions might at first glance be mistaken for tuberculous, but their special aspect, their color varying from violet to a yellowish red, punctured with yellow points, the slowness in developing, and the presence of the characteristic yellow grains in the pus, soon differentiate it. The prognosis is grave, although life may be prolonged many years. If internal treatment with potassium iodid proves ineffectual, ablation of the masses and incision of pus pockets are indicated. Extensive interventions are justified, as repair progresses rapidly in the tissues which appear to be so profoundly affected, although intervention rarely proves more than palliative.—*Bull. de l'Acad. de Méd.*, September 13.

**The English Tourist, Dr. Henry S. Lunn.**—Dr. Henry S. Lunn, the English physician who is well known in England and America for developing the personally conducted touring system, is this year entering upon a decidedly novel plan. He has decided to send a couple of sporting and scientific expeditions into the wild regions of Somaliland. The cost of these expeditions will be about $3000 for each member; but this includes all expenses for three months, a retinue of fifteen servants, twenty camels and two riding horses each, beside the tents and equipments. Personally, Dr. Lunn is most genial. He has had a rather varied career. In 1887 he left England for the Indian mission field as a medical missionary. As correspondent to the *Pall Mall Gazette*, he attended the Indian National Congress, becoming intimately acquainted with the leaders of the movement, and lecturing to large assemblies of educated Hindus on the development of their national life. The vigor with which he threw himself into his Indian work was responsible for a series of attacks of malarial fever, and he was ordered home only twelve months after he had entered the work. Dr. Lunn is not yet 40 years of age.

**A Lesson to the Unwary.**—Medical men in England are dissatisfied at the outcome of a libel suit brought by Dr. Morgan Dockrell, physician to St. John's Hospital, against the manufacturer of a medicinal water which the doctor had praised and occasionally prescribed. The defendant printed and published a circular in which he declared: "Dr. Dockrell says nothing has done his gout so much good." The jury found that these words were in no wise injurious to the plaintiff's reputation, and hence the High Court of Justice refused to restrain the further publication of the advertisement. Dr. Dockrell's contention was that the circular conveyed the idea that he was a party to the advertisement, which would be a violation of professional etiquette on his part, and would have rendered him liable to expulsion from the medical societies to which he belonged. The jury, however, refused to take this view, and evidently deemed the language justified by what the plaintiff had actually said in commendation of the mineral water in question.—*N. Y. Sun.*

**School of Medicine for Women.**—New science laboratories in connection with the London School of Medicine, have been opened. The school was established nearly a quarter of a century ago, and during this time the work has been carried on in three houses, under most inadequate conditions. The leases of these buildings having expired, the site has been obtained and cleared for the new building, which will be erected in three separate stages and is to consist of three blocks. The first block, which has already been completed, contains the new laboratories. The cost has been between £9000 and £10,000. There are adequate rooms for the teaching of chemistry, physiology, anatomy and physics. At present women are enabled to obtain a degree or diploma from nine of the medical examining bodies of the United Kingdom, six of them being universities. Since the school started, the students have obtained several gold medals at the London University and at the Royal University of Ireland. At the present time the students number 170. Of those who have passed out of the school with a medical qualification, some are engaged in responsible work as medical practitioners, some at the new hospital, others in workhouse infirmaries, in asylums, and in various provincial hospitals. Others are in India, South Africa, China and Australia.

**A Defense of Chief Surgeon Girard.**—The many fierce, not to say brutal, attacks on Lt.-Col. and Chief Surgeon Girard, who is well known to be one of the ablest and most painstaking officers in the army, has led many of his colleagues to write him their personal views of his services. We are permitted to extract the following from one of the pleasant tributes thus presented. It is from a volunteer surgeon, now mustered out.

EXTRACTS FROM LETTER.

"I desire to state that I have at all times enthusiastically approved your plan of Division Hospitals, and I am sure that the public mind seems to be gradually coming to its senses in this regard.

"It is a probable and an unfortunate circumstance that the

great mass of the American people will perhaps never fully realize the almost insurmountable difficulties met and overcome in organizing, harmonizing and equipping the medical corps of the various regiments of your command, and the endeavor to elevate their efficiency to something like the standard of the regular army. As you know, many of these regiments were absolutely without arms or equipment of any kind when they reached Camp Alger, and it has been truthfully said that 'in some cases there was scarcely cover for the nakedness of the men.'

"It became necessary to immediately arrange for the care of the sick. This was especially noticeable in the case of the . . . . But to return to the subject. With a medical corps scarcely organized, some officers even without commission, with no hospital privates; other regiments but partially organized, none thoroughly equipped, and even if fairly well organized and equipped, the military requisites of subordination and discipline were lacking. The spirit of opposition characterized by delay and general indifference manifested by some of the volunteer medical officers, as well as regimental commanders, is still fresh in my mind.

"The rapidity and completeness in overcoming these obstacles certainly points to the credit of your command, and your many years of military training and business tact are the prime factors in its success.

"It is true that some medical officers did at times complain of trivial delays and possible lack of equipment, but as a rule the basis of these complaints was groundless. There never was a time when their requests were not promptly honored, if reasonable, and supplies promptly granted when circumstances permitted. These complaints as a rule were voiced simply for effect, as a general disapproval of what certain volunteer officials considered an interference on part of the regular army officials with the rights of the volunteer.

"That such harmonizing was necessary is evident; that it was accomplished is apparent in the present efficient management of these departments. Having overcome all these difficulties with complete satisfaction to all, is certainly a glowing tribute to your faithful and untiring efforts to excel in the efficiency of your medical corps. All these conditions I describe fully in my sanitary report which I am now preparing for the Surgeon-General.

"In conversation with a number of my friends shortly after I arrived at Camp Alger, I was frequently asked 'how I liked Chief Surgeon Girard?' It was the general opinion among them that you were the right man in the right place. They said: 'Girard is considered the best disciplinarian in the Medical Department of the U. S. Army.' To some this perhaps seemed a fault; but I consider it to be the highest compliment, and I congratulate myself upon being so fortunate as to have been under your medical direction, as I am fully aware that without discipline organization can not be maintained nor progress assured."

## Hospitals.

The new St. Joseph's Infirmary, Fort Worth, Texas, was formally opened September 29. It is a fireproof, three-story structure of brick, 170 by 150 feet.——The new hospital for the special treatment of tuberculosis at Dunning, Ill., was dedicated October 8. The cost of the building, three stories in height, was $54,200; with furnishings. $64,200.

## Societies.

The following recent meetings are noted:

*Illinois.*—Chicago Medical Society, October 5; Chicago Pathological Society, October 10; Will County Medical Society, Peoria, October 11.

*Indiana.*—Upper Maumee Valley Medical Association, Fort Wayne, October 6.

*Iowa.*—Cedar Valley Medical Association, Waterloo, October 11; Clinton County Medical Society, Clinton, October 4; Polk County Medical Society, Des Moines, October 4.

*Missouri.*—Jasper County Medical Society, Joplin, October 4; Medical Society of the City Hospital Alumni, St. Louis, October 6.

*New York.*—Broome County Medical Society, Binghamton, October 4; Onondaga Medical Society, Syracuse, October 4; Orange County Medical Society, Newburgh, October 4.

*Ohio.*—Marion County Medical Society, Marion, October 4; North Central Ohio Medical Society, Marion, September 30.

*Pennsylvania.*—Lackawanna Medical Society, Scranton, September 30.

*Vermont.*—State Medical Society, Brattleboro, October 13 and 15.

## Cincinnati.

HOSPITAL INTERNES.—On October 10 the terms of service of four of the internes of the Cincinnati Hospital will expire; they are Drs. H. J. Ware, Edward Francis, William Muhlberg and Percy Shields. Drs. H. H. Hines, C. F. Beeson and A. R. Smith will take their places. Dr. T. S. Morrison, the other successful candidate, is at present in Manila, assistant-surgeon of the First Regiment, Wyoming Volunteer Infantry, a part of General Merritt's immediate command.

ACADEMY OF MEDICINE.—At the regular meeting, October 3, Dr. C. A. L. Reed read a very interesting paper on "Fat and Fecundity."

DR. CHARLES H. CASTLE, surgeon First Ohio Cavalry, is in the city, waiting for the muster-out.

DR. S. P. KRAMER writes from Camp Wikoff as follows: "The typhoids are very typic, but in many cases they are associated with malaria. One sees cases that are clinically undoubtedly typhoid, and in addition the plasmodium of malaria is found in the blood." In speaking of malaria he says: "The malarial cases are not typic at all. Very few are purely intermittent; most of them are remittent, and many of a pernicious nature. In the latter cases the best results are obtained from the hypodermic administration of the double chlorid of quinin and urea." The dysentery prevailing, the doctor thinks, is largely due to malarial poisoning. The yellow fever cases, he says, are few, and there is little or no danger of the infection spreading.

## Philadelphia.

PAMPHLET ON YELLOW FEVER.—As yellow fever prevails in several sections of the South, with the probability of its spreading still further, the State Board of Health has been energetic in educating the laity regarding the nature of the disease and it proper prevention. Looking to this end a pamphlet has been printed and is being freely distributed throughout the State, giving all of these necessary details and pointing out that the baneful effects are not so severe as is generally supposed.

DR. PEPPER'S SUCCESSOR STILL SUB JUDICE.—At a recent meeting of the trustees of the University of Pennsylvania, the subject of Dr. Pepper's successor was again presented for discussion, but owing to the action taken at a previous meeting, distributing the work among four of the faculty, no definite action was taken. Didactic lectures will be given by Drs. Stenger, Musser, Packard and Fussell, while Dr. James Tyson will have full supervision over both this department and the clinical lectures until the trustees take some definite action in the disposition of the chair. The four years' course of eight months each demanded by this institution, has not kept down the number of matriculates; but, in fact just the reverse has occurred. It is a matter of serious reflection why so many men go into the medical profession, whether it is due to the hard times which impels them to choose something, or whether it is from other causes.

PUBLIC SCHOOLS AND DIPHTHERIA.—From the fact that diphtheria has been so prominent in several of the public schools of the city, the Bureau of Health is using every effort to prevent the disease from spreading. To this end, therefore, it is that suggested to keep down these local outbreaks that the schools be thoroughly disinfected daily in the following manner: "The daily sprinkling of the floors before sweeping with a disinfectant solution, the use of individual drinking cups and the disinfection of pencils. The attention of the Bureau of Public Education has been called to most of these unsatisfactory conditions, but it is doubtful if any special attention has been given to the matter. It is work that can and should be done by the Board of Education. The desk tops should be wiped off daily with a disinfectant solution and the hand-rails should be treated in the same way. It would not be safe to use a solution of bichlorid nor even carbolic acid." It is sug-

ed that these suggestions be given to the janitor in order t they be carried out. A paper was received and referred he Board, asking that disinfectants also be put in the street nkling wagons in order to destroy the germs which make ir habitat in the dust of the public thoroughfares.

Dr. Pepper Esteemed.—It is stated that members of the ternational Advisory Board of the Philadelphia Commercial seum very frequently receive letters of condolence from nds of Dr. Pepper in all parts of the world. These letters only show that he was known as a physician of distinished ability, but as a public-spirited citizen. In Mexico, ere he presided over the deliberations of the Pan-American dical Congress, marked honor has been shown. Delegates the meeting held at the Philadelphia Commercial Museum o pay high tribute to his memory. The Mercantile Confedation of the Republic of Mexico, at a recent memorial meet, President Diaz being present, and at which time the tional flag of that republic, with that of the United States, re entwined about the hall with a tinge of crape, gave a rtfelt feeling to the words spoken in honor of the name of illiam Pepper.

Pay for Soldiers.—The government has recently inquired the hospitals of this city as to the amount required by each them for the care and treatment of the sick soldiers brought re. So far no definite arrangement has been made toward king the government to defray the expenses for this trouble, d it seems the action of the government has been voluntary. is reported that those soldier patients now in the New York spitals each receive pay at the rate of 93 cents a day. The easurer of the National Relief Association ackowledged ceipts of money and supplies aggregating the sum of 07,511.48.

Tuberculosis still Decreasing.—In the annual report of e Pennsylvania Society for the Prevention of Tuberculosis, cts are tabulated showing a gradual decrease in the number deaths from this disease. In Philadelphia statistics are pre nted proving these claims. In 1870 there were 2308 deaths, 3.42 per 1000 of the population; in 1880 the percentage was 17, in 1890, 2.64, and in 1897, with 2385 deaths, the percentas 1.96. A site at White Haven, Luzerne County, has been ffered to the society for a sanitarium, and it is hoped that roper aid will be given by the State for the erection of a uilding suitable for the care of those suffering from conumption.

Bequest of $400,000.—Through the death of Joseph M. Bennett of Philadelphia the University of Pennsylvania will eceive property to the value of $400,000. The provision mak ng the bequest is as follows: "I will and bequeath to the rustees of the University of Pennsylvania the property, 1021 Chestnut Street, adjoining the Chestnut Street Opera House, lso the properties 3340, 3342, 3344 and 3346 Walnut Street, eing east of the properties which I have heretofore donated t the corner of Thirty-fourth and Walnut Streets, known as Bennett Hall, to said trustees. Now, my object in making this bequest is to further aid and encourage the said trustees in arrying out more practically and thoroughly the co-education f women and girls in relation to the scheme which has been ommenced in the said houses," etc.

Mortality Statistics.—For the week just closed the records of the Bureau of Public Health show that there have been 408 deaths, 137 being children under 5 years of age. The follow ng are the principal causes: Alcoholism 2, apoplexy 17, ephritis 20, cholera infantum 8, cholera morbus 1, tubercuosis 42, membranous croup 4, diabetes 1, diarrhea 2, diphtheria 22, heart disease 27, typhoid fever 14, dysentery 4, homicide 1, marasmus 31, septicemia 3, suicide 1, tetanus 1, uremia 7, whooping-cough 2.

Hospital Train Sent Out.—Jefferson Medical College recently dispatched a hospital train to Camp Meade, returning with fifty-two patients. It is stated that most of the patients were in a very serious condition. The train was in charge of Dr. H. A. Hare, assisted by Drs. M. H. Williams, E. H. Wiggins, J. L. Scallinger and Hiram R. Loux. A corps of twelve nurses accompanied the train.

Camp Meade.—Dr. Shakespeare, a member of the board appointed by the War Department to investigate the prevalence of typhoid fever among the different army camps, has been detailed to make report regarding the conditions existing at Camp Meade. It is stated that in this camp the disease is mostly confined to the troops belonging to the Two Hundred and Second and the Two Hundred and Third Regiments of New York.

The Jefferson and Medico-Chirurgical Medical Colleges.—During the week just passed both of these institutions began their sessions for the coming year. At the Medico-Chirurgical, exercises were also held in the dental and pharmaceutic departments, both of which have been recently established.

Salaries of Prison Inspectors.—A recent decision of Judge Pennypacker of Philedelphia, handed down in a contested case, states that the Board of Prison Inspectors of the county prison and not the city councils have the right to fix the salaries of officers of the county prison.

## Washington.

Health of the District.—The report of Health Officer Woodward, for the week ended October 1, shows the total number of deaths to have been 106—48 white and 58 colored. The principal causes of death were: Nervous diseases, 13; genito-urinary, 7; circulatory, 4; intestinal, 10; typhoid fever, 4; diphtheria, 7; measles and whooping-cough, 1 each. At the close of last week there were 79 cases of diphtheria under treatment, and 44 new cases reported during the present week; 19 were reported cured, leaving 104 cases under treatment at the close of the present week. There were 68 cases of scarlet fever under treatment at the close of the week. Dr. Woodward says there are a large number of cases of diphtheria in the district. One year ago the number was 44, while this year, on the corresponding date, there are 108 cases, an increase of more than 200 per cent. The cases existing at present are distributed among 79 places, while those of a year ago were located in 36 places. He says the large increase in the number of cases is accounted for by the improvement in diagnosis. Cases which formerly were called sore throat or tonsillitis or croup, are now known to be diphtheria, and after bacteriologic test, are reported as diphtheria. The increase in the number of cases is of course accompanied by an increased death-rate. The disease is more prevalent among the poorer classes, and ignorance and carelessness on the part of these people is largely responsible for the increase of the disease. I know of five cases where children were ill before a physician was summoned, one of whom being so ill that it died the day the doctor was called. The opening of the schools is usually another cause for the increase of the disease, due probably to the massing of a large number of children. We are doing all we possibly can to check the spread of the disease, but we are greatly hampered by the limited authority of the Health Department.

Army Investigation.—Surgeon-General Sternberg, in reply to the questions relating to the Medical Department management, forwarded to him by the Investigating Commission, replied as follows:

*To President of Board to Investigate the War Department:*

*Sir:*—I have the honor to submit for the Committee of Investigation, the enclosed statement relating to responsibility in the Medical Department of the Army. I respectfully suggest that the commission, as a whole or a sub-committee, visit the office of the Surgeon-General at an early day for the purpose of investigating the organization and methods of work which have been employed in my office during the war with Spain. I have received a copy of the questions relating to the Medical

Department, and shall do my best to answer these questions in full at as early a date as is practicable; but considerable time will be required, owing to the enormous amount of important official business, pertaining to the regular administrative work of the office. To neglect this would give just cause for criticism, and I am sure that the commission will agree with me, that my first duty is to provide for the proper care of the sick of our army, in the field and in garrison, so far as this lies in my power. This has been my earnest endeavor from the outset of our short and glorious war with Spain. Very respectfully,

GEORGE M. STERNBERG, Surgeon-General U. S. Army.

MEDICAL ASSOCIATION.—The regular stated meeting of the association of the district was held on the 4th instant. The Standing Committee, who had been entrusted with the enforcement of the regulations governing medical charities in the district, reported that all the hospitals were carrying out these rules and regulations, both in letter and spirit. The following were elected to active membership: Drs. Chas. E. Furgeson, Bernard L. Hardin, Frederick M. Hartsock, Harry Hurtt, L. Fleet Luckette, C. H. Mechineck, W. P. Malone, Wm. Gerry Morgan, John B. Mullins, Wallace Neff, Edward D. Perkins, T. Lyman Perkins, John J. Repetti and Stanley S. Warren.

DISTRICT MEDICAL SOCIETY.—At the meeting of the medical society, October 5th, the following were elected to membership: Drs. Isabell Haslup, Maurice E. Miller, Jessie Ramsburgh, John C. Simpson and Victor E. Watkins. Dr. James Kerr read a paper entitled, "Treatment of Colles' Fracture by Gordon's Splint." He presented the splint of Dr. Gordon of Belfast, explaining its special advantages based upon the skiagraphic study of this fracture, and showed the disadvantages of the other methods of treatment. He said the use of the Gordon splint had given universally good results in his cases. An interesting discussion followed, pro and con, participated in by Drs. Hammond, Van Rensselaer, Hough and Frederick. In closing, among other things, Dr. Kerr said facetiously, that the bad results reported by the speakers occurred in the cases where the Gordon splint had not been used. The president, Dr. Busey, announced the death of Dr. Draughbaugh in the army at Santiago, and upon motion a committee was appointed to draft suitable resolutions to be sent to the family of the deceased.

DR. GALLINGER.—Dr. Ralph E. Gallinger, son of Senator Gallinger, has resigned from the assistant staff of the Central Dispensary and Emergency Hospital, and has begun practice in Concord, N. H.

DEATH OF DR. BREWER.—Dr. Madison M. Brewer, one of the surgeons who recently returned ill from Santiago, died of typhoid fever at Garfield Hospital on the 3rd inst. Dr. Brewer was son of Dr. John Brewer, U. S. A., was a graduate of the Columbian Medical College, and formerly resident physician at the Garfield Hospital.

CHANGES AT THE EMERGENCY HOSPITAL.—The term of service of Dr. James D. Fife expired on the 30th ultimo, and Dr. W. N. Glover was appointed resident physician to succeed him. Dr. W. H. Mohart became first assistant, and Dr. Thompson, of the University of Virginia, who recently passed the competitive examination, was appointed second assistant resident.

REPORT OF COMMISSIONERS OF PHARMACY.—Dr. John T. Winter, president of the Commissioners of Pharmacy, has submitted their annual report for the year ended June 30. The report shows that thirty applicants were examined during the year. Eight of the applicants passed satisfactory examinations and were licensed; twenty-two failed to pass after a second examination, and were refused registration; thirty-seven graduates of chartered colleges of pharmacy were registered on the presentation of their diplomas.

GEORGETOWN MEDICAL SCHOOL.—The Medical Department of the Georgetown University began its session on the 2d, with a large increase in the number of its students. The University Hospital is doing excellent work. The Emergency Department is in charge of Dr. W. C. Gwynne as resident, and Dr. James J. Kilran as extern. Dr. J. J. Kinyon was appointed Professor of Pathology and Bacteriology; D. J. D. Morgan, Professor of Clinical Medicine and Dr. C. L. Allen, Clinical Professor of Diseases of the Nervous System. Dr. J. W. H. Lovejoy resigned the chair of Theory and Practice of Medicine, and was elected Emeritus Professor of Theory and Practice of Medicine. Dr. Samuel S. Adams has been elected his successor. Dr. Lovejoy was one of the original faculty at the opening of the school in 1851, holding the chair of Professor Chemistry until 1854. In 1880, after an interval of twenty years, Dr. Lovejoy re-entered the faculty as Professor Materia Medica and Therapeutics, which he continued until 1883, when he was elected to the chair of Theory and Practice of Medicine, on the resignation of Dr. Samuel C. Busey.

MEDICAL DEPARTMENT COLUMBIAN UNIVERSITY.—The Medical and Dental Departments of the Columbian University opened their respective schools on the 3d instant. Dr. W. Johnston, Professor of Theory and Practice of Medicine, delivered the address to the medical students, and Dr. J. H. Lewis, Dean of the Dental Faculty, addressed the dental. Dr. E. A. DeSchweinetz, Dean of the Medical School, announced the formal opening of the Columbian University Hospital.

## CHANGE OF ADDRESS.

Black, J. F., from Springfield, Mass., to 244 E. 19th St., New York, N. Y.
Bindley, J. H., from Cincinnati, Ohio, to Hicks Bldg, San Antonio, Tex.
Druet, A. L., from Hiteman to Marysville, Iowa.
Donohue, M. J., from Chicago, Ill., to Clintonville, Wis.
Feltwell, A. L., from Altoona, Pa., to 1528 Snyder Ave., Philadelphia, Pa.
Frahm, M., from Tuscola to 288 Michigan Ave., Chicago, Ill.
Faris, J. W., from Caruthersville to Female Hospital, St. Louis, Mo.
Gurney, G. S., from 286 E. 7th to 263 Sherburne Ave., St. Paul, Minn.
Glasgow, F. A., from 2608 Locust St. to 3894 Washington Ave., St. Louis, Mo.
Haubold, H. A., from Elberon, N. J., to 140 E. 72d St., New York City.
Hawthorne, E. W., from New Cambria to Gypsum City, Kan.
Kuhn, G. A., from 2625 St. Louis St. to 2702 N. Grand, St. Louis, Mo.
Kirkbride, M. F., from Spring Lake Beach, N. J., to 2212 Green St., Philadelphia, Pa.
Kaestlen, S. E., from 615 Lorain to 50 McLean St., Cleveland, Ohio.
Little, W. J., from Madison, Neb., to Independence, Mo.
McDougall, C. D., from Hixon to Athens, Ohio.
Montgomery, F., from Mt. Sterling to Clayton, Ill.
Moore, J. E., from Cumberland, Ohio, to Alliance, Neb.
McGahan, C. F., from New York, N. Y., to Aiken, S. C.
Nolder, S. M., from Tipton to Elwood, Ind.
Rogers, M. W., from Carlton to Alexander, Texas.
Simpson, B. S., from 4555 Delmar to 4227 Finney Ave., St. Louis, Mo.
Schorr, E., from 361 Antoine St. to 114 Elizabeth St. E., Detroit, Mich.
Smith, E. F., from 257 W. 44th to 308 W. 45th St., New York, N. Y.
Smith, P. C., from Bellvue to Assyria Centre, Mich.
Sloan, I., from 274 W. 12th St. to 486 Hermitage Ave., Chicago, Ill.
Tabb, D. R., from Chicago, Ill., to U. S. Marine Hospital, Reedy Island, Del.
Williams, E. C., from Bloomington to 628 W. Adams St., Chicago, Ill.
Wright, M. J., from Mason to 602 Michigan Ave. W., Lansing, Mich.
Zapffe, F., from 311 E. North Ave. to 925 Warren Ave., Chicago, Ill.

## LETTERS RECEIVED.

American Therapeutic Co., New York, N. Y.; Ammonol Chemical Co., New York, N. Y., (2).
Bischoff, C. & Co., New York, N. Y.; Blodgett, F. J., New York, N. Y.; Bower, G. S., Ransom, Ill.; Brown, Alice C., New York, N. Y.; Bromine-Iodine Chemical Co., Binghampton, N. Y.; Billings, Frank, Chicago, Ill.; Bailey, S., Mt. Ayr, Iowa; Blackbourne, F. E., Beltown, Wis.; Bailey-Steele, Stanford, Ky.; Briggs, E., Wilmington, Ohio.
Carter, Geo. D., Saverton, Mo.; Chandler, J. G., Detroit, Mich.; Choate, D., Salem, Mass.
Daily, M., Sheldon, Iowa.
Edes, Robt. T., Jamaica Plain, Mass.; Emanuel, H. W., Minor, N. Y.; Erwin, A. J., Mansfield, Ohio.
Fuller's, C. H., Adv. Agency, Chicago, Ill.; Ferguson, E. D., Troy, N. Y.; Forman, B. H., Ione, Cal.
Gihon, A. L., New York, N. Y.; Galloway, D. H., Chicago, Ill.; Gibson, Robt., Watford, Ontario; Guiteras, John, Philadelphia, Pa.; Garber, S. C., Camden, Ark.
Haubold, H. A., New York, N. Y.; Holstein, Geo., Bridgeport, Pa.; Haldenstein, I., New York, N. Y.; Howard, C. Norman, Washington, D. C.; Hurty, J. N., Indianapolis, Ind.; Heddens, C. H., Wellsburg, Iowa; Heimann, A. L., Minneapolis, Minn.; Hummel, A. L., Adv. Agency, New York, N. Y., (2).
Johnson, C. H., Grand Rapids, Mich.; Jarrett, H. S., Towson, Md.
Kinnaman, R. C., Ashland, Ohio; Kimball, C. B., National Military Home, Ind.; Kreveling, Geo. B., Philadelphia, Pa.; Kefauver, C. A., Stoutsville, Ohio; Kearney, C. A., Farley, Iowa; King, F. R., Anita, Iowa; Keener, W. T., Chicago, Ill.; Kempson, J. F., New York, N. Y.
Meinert & Fisch, Remsen, Iowa; Malt Diastase Co., New York, N. Y., (2); McLain, W. H., Wheeling, W. Va.; Mathews, J. M., Louisville, Ky.; McLean & Co., S. F., New York, N. Y.; Miner, W. W., Ware, Mass.; Mouro, E. J., Bordeaux, France; Mayer, Emil, New York, N. Y.; Moore, W. A., Hindsville, Ark.
Outten, W. B., St. Louis, Mo.; Ottolengui, R., New York, N. Y.
Publishers Collection Agency, Chicago, Ill.; Putnam's, G. P., Sons, New York, N. Y.; Parker, E. F., Charleston, S. C.; Plummer, C. G., Salt Lake City, Utah; Pike, E. R., Abington, Conn.; Paquin, Paul, Laboratories, St. Louis, Mo., (2).
Reeve, D. N., Allison, Iowa; Rogers, John, Jr., New York, N. Y.; Reed, C. A. L., Cincinnati, Ohio; Reed, W. W., Fowler, Colo.
Shotwell, A. N., Mt. Clemens, Mich.; Sherer, J. W., Kansas City, Mo.; Shaffer, J. W., Sandusky, Ohio; Stout, J. C., Oakland, Cal.; Stewart, F. H., Brooklyn, N. Y.; Sutton, E. M., Peoria, Ill.; Smart, Chas., Washington, D. C.
Thayer, Chas. P., Boston, Mass.; Taylor, M. B., Trion, Tenn.; Tyson, James, Philadelphia, Pa.; Thilo, Geo., Jr., Chicago, Ill.; Taylor, A. S., Orlando, Fla.
Womack, C. W., Chapel Hill, Tenn.; Wishart, J. S., Toronto, Canada; Wellington, J. R., Washington, D. C.; Willard, L. M., Wausau, Wis.; Worden, N. E., Bridgeport, Conn.; Weaver, Geo. H., Chicago, Ill.; Webster, David, New York, N. Y.
Zenner, Philip, Cincinnati, Ohio.